Textile World

ESTABLISHED 1868

CONTENTS SEPTEMBER, 1933

DOUGLAS G. WOOLF
Editor

William B. Dall.....*Managing Editor*
Edwin D. Fowle.....*Associate Editor*
Winn W. Chase.....*Assistant Editor*
James A. Austin...*New England Editor*
Ralph C. Maultsby....*Southern Editor*
Paul Wooton. *Washington Correspondent*

A Few Statistics—And a Moral (Editorial) 53
Another Milestone in Synthetic Fibers (Editorial) 55
Rayon Output—208,000,000 lb. for U. S. in 1933 55
Status of Textile Codes Indicates Rapid Progress 79
The Textile Codes at a Glance—Provisions Tabulated 80
Processing Tax—Is It Straw Which Breaks Camel's Back? ... 85

Expansion of Quality Outlets Is Keynote in Rayon Selling 60
What About New Products in Yarn? 86

Rayon Is Better—in Strength, Fineness, Pliability, etc. 56
Wide Choice of Materials for Sizing Rayon Warps 64
Silk Classification Aided by Higher Seriplane Standard 93

Effect of Codes Cannot Yet Be Gaged Accurately 84
Overseers' Round-Table 98
Personal Page 105

Ageing Vat Colors—Engineering Problems 92
Unit Heaters—Installation and Operation for Efficiency 96
New Machinery and Processes 102

Year's Developments in Rayon Manufacture 58
Reduced Costs Mark Progress in Rayon Throwing 62
Rayon in Cotton Mills—Larger Skeins and Cones 63
Improved Finishes Attest Gains in Rayon Processing 66
Rayon Hosiery Aided by Dull Luster, Finer Filaments 68
Rayon Underwear—Larger Cones, Magazine Feed, etc. 70
Rayon Fabrics of Today—New Products Illustrated 71
Loom Test Analysis—Correcting Causes for Stoppage 88
Composite Worsted Yarn Mill—Best Features of 20 Plants .. 89
New Method for Merinos on Cotton System 90
Warmth-Weight Study of Knit Goods 91
Full-Fashioned Defect Recorded by Camera 94
Research on Fulling Points Way to Change in Practice 95

INDUSTRY BRANCHES

Cotton Digest 108
Wool Digest 110
Silk Digest 112
Rayon Digest 114
Knitting Digest 116
Processing Digest 118
Industry-Wide Events 104

DEPARTMENTS

Overseers' Round-Table 98
Personal Page 105
Questions and Answers 100
New Machinery and Processes 102
New Publications and Business News 106
TEXTILE WORLD Analyst 107
Quotations 120

McGRAW-HILL PUBLISHING CO., INC.
Bragdon, Lord & Nagle Division, 330 West 42d St., New York

Bragdon, Lord & Nagle Division
Henry G. Lord.....*President*
Frank L. Nagle.....*Chairman*
James H. McGraw, Jr.....*Treasurer*
Herbert O. Barnes.....*Secretary*

McGraw-Hill Publishing Co., Inc.
James H. McGraw.....*Chairman of Board*
Malcolm Muir.....*President*
James H. McGraw, Jr.....*Vice-Pres., Treas.*
Henry G. Lord.....*Vice-President*
B. R. Putnam.....*Secretary*

Branch Offices:
Washington.....*National Press Building*
Boston.....*1427 Statler Bldg.*
Philadelphia.....*16 South Broad St.*
Greenville, S. C.....*1303 Woodside Bldg.*
Chicago.....*520 N. Michigan Ave.*
Cleveland.....*501 Guardian Bldg.*
St. Louis.....*1556 Bell Telephone Bldg.*
Detroit.....*2-257 General Motors Bldg.*
San Francisco.....*883 Mission St.*
London, England...*Aldwych House, W.C.2*

Copyright 1933, by McGraw-Hill Publishing Co., Inc.

TEXTILE WORLD

(Formerly *Textile World Journal*) with which are combined *Textiles, Posselt's Textile Journal* and *Textile Advance News*. Published monthly. United States and Possessions, $3 per year; Canada (including Canadian duty), $3.50; all other countries $5, U. S. currency or 25 shillings. Price of this issue, $1.00.

Member A.B.P. *Member A.B.C.*

Thinking in Terms of

OUR CUSTOMERS' NEEDS

NEW HOPE is springing in the hearts of the American people. It is born out of the experiences of the past few years of doubt, when sales volume shrank and price-cutting at the expense of quality was rampant. ◆ ◆ In this period INDUSTRIAL, undismayed by conditions, pursued a constructive policy that was of material assistance to customers. New products were perfected. They were backed by efficient service. An intelligent merchandising program helped customers find broader markets where it was possible to sell products made of INDUSTRIAL yarn or cloth on a definitely profitable basis. ◆ ◆ Now people are again beginning to buy more freely. They are seeking sound values, not "price bargains." In this changing picture manufacturers and retailers are finding INDUSTRIAL'S policy of cooperative helpfulness of still greater aid in commanding their full share of this growing quality market. ◆ ◆ Even though we are oversold at the moment there will be no lessening of effort to improve our products and our service. Our Trade Promotion will be even broader in scope than in the past. By continuing to think in terms of our customer's needs we hope to be able to build still greater reserves of friendship and good will.

INDUSTRIAL RAYON CORPORATION

9801 WALFORD AVENUE • CLEVELAND

Exclusive Producers of

SPUN-LO, PREMIER RAYON and DUL-TONE

Yarns and Knitted Fabrics

September, 1933

Textile World

PUBLISHED BY BRAGDON, LORD & NAGLE CO.
DIVISION OF McGRAW-HILL PUBLISHING COMPANY, INC.

Vol. 83, No. 10

Editor: DOUGLAS G. WOOLF

A Few Statistics—And a Moral

IT is interesting—and should be profitable—to get an over-all view of the performance of the textile industry during the last year. To do so, it is necessary to indulge in a few statistics. We shall try to make them as painless as possible.

Whether we realize it or not, we have been going along at a pretty good clip since August of last year. Starting, then, from what was probably the low point of recent textile history, mill activity hit a good pace through the fall of 1932, slackened somewhat during the winter, and then reached feverish heights in the spring and early summer.

Based on total consumption of textile fibers, rate of operations of textile mills during the twelve-month period from Aug. 1, 1932 to July 31, 1933 was 25% higher than during the corresponding period of 1931-32; 15% above the same period of 1930-31; and 2% above the 1929-30 period. It was 10% higher than the average for this four-year period, which represents roughly the span of the depression.

Furthermore, activity during the twelve months ending July 31, this year, was just about at the same rate as that of the average calendar year during the eight-year period 1924-1931, which we have assumed as an approximate "normal."

▼

What does all this mean?

It means, primarily, that there is little justification for expecting a continuation of the activity of spring and early summer this year. Taking the months of May, June and July, textile mills operated at a rate which, translated into annual terms, was 10% higher than the banner year 1929, and 25% above the "normal" year mentioned previously.

Now it happens that there is no reason to expect a demand equivalent to this over any reasonably long period of time. People unfamiliar with the textile industry, except through newspaper headlines, are apt to think of it as a "feast or famine" industry. From the standpoint of actual consumption of its products, this description does not apply.

To make this point clear, it is necessary to resort again to statistics. Taking the average annual production of the 1924-31 period as 100, the low year in that period (1930) was 87 and the high year (1927) was 115. In other words the low year was only 13% below the average and the high year was only 15% above the average.

Now, even if generally improved business during the next year should push textile demand up to the 1927 level, that would mean a warranted production during the next year of only 15% above the previously mentioned "normal"—and not 25% above, as was true in May, June and July.

Furthermore, it must be remembered that part of the latent consumer demand for textiles has been released during the last year. We have pointed out repeatedly that it is impossible to defer replacement of a shirt or a pair of trousers as long as that of capital goods, such as steam pumps, or more durable consumer goods, such as automobiles. That fact accounts for the relatively more stable rate of activity in textiles during the depression than in, say, automobiles. It also accounts for the minor boom which textiles enjoyed, starting in August 1932, while the steel industry continued to scrape bottom for many months thereafter.

▼

All of this may sound pessimistic. It is so, only in so far as facing facts is pessimistic. We doubt that any thinking textile manufacturer deluded himself with the notion that the May-June-July rate of activity could continue indefinitely. We doubt that he was greatly surprised at the falling off in demand in August. We believe he recognized that a large part of the first-hand business

done during those three months was in anticipation of the effects of the codes and the processing taxes; that the goods had not yet moved into actual consuming channels; and that the real test of consumer acceptance or rejection was to come.

As we write this, that test is still largely in the future. If the test is to be passed satisfactorily, and the textile industry and its workers are to embark upon a period of sustained prosperity, it is essential that all manufacturers should keep fully aware of the above facts, and of their implications.

Those implications are:

1. There is no reason for panic over declining demand at first hand.

2. There is every reason for continued maintenance of balance between production and demand.

3. There is need for sane price policies which will keep goods moving in maximum volume to consumers and yet yield, of course, the fair wages which the codes promise to employees, and a fair profit which the NRA has promised to industry.

The last clause is the most important.

As industries become more experienced in codeology, they will find that it is much easier to check over-production, and to check wage-chiselers, than it is to insure a *fair* profit. There is, in this statement, not even an implied criticism of the fundamentals of the NRA movement. There is merely recognition of the fact that production schedules and wage levels are subject to more tangible and more prompt analysis and exposure than are profit margins.

As the fair trade practice clauses of the codes become operative, margins will become somewhat more controllable. But there will always be more leeway for the injection of individual common-sense and honesty, or the lack of both, into price policies than into policies governing wages and production.

Consequently, at the start of the experiment, it is essential that manufacturers, individually and collectively, bring their best thinking to bear upon future price and profit policies. It is evident that, given unprofitable prices, fair wages cannot long be paid. It is equally evident that, given excessive prices, consumer demand cannot be maintained. The condition resulting from either of these two situations would be just exactly what NRA is trying to correct: industrial stagnation.

Excessive prices, of course, may result from excessive costs or from excessive profits—or from a combination of the two.

Base labor costs have been set by the codes—and we do not believe the industry will ever regret this step forward. Raw material costs, in certain branches of the industry, either have been, or may later be, sharply affected by the processing taxes. If it can be shown that those taxes seriously threaten consumer response, the whole spirit of the recovery movement would seem to demand that some form of amelioration be granted to the industry and its workers. Costs other than those of labor and materials can be reduced by sound policies of management and modernization.

There is then left the question of profits. Here, we repeat, there is still the greatest play for individual action. Consequently, to get back to our statistical starting-place, there is a demand for resistance to panic during periods of normal slackening in demand, and resistance to price skyrocketing during peak periods.

In no other way can the industry find permanent relief from the burden of fairly well maintained, but unprofitable, activity which it has shouldered during recent years.

A FEW of the "dead cats" which General Johnson foresaw are being hurled in the direction of the NRA. Thus far, most of them are kittens which haven't been dead very long. But they may be expected to grow in size and in degree of putrefaction. . . . There is resentment against some of the forceful, and admittedly ill-chosen, utterances of an over-worked and over-wrought Administrator. There is fear of the horrors of a boycott. There is concern over rising prices. There is, on the one hand, the charge that NRA is helping to unionize industry; on the other, is the complaint that labor is getting the raw end of the New Deal. There is criticism of the fact that the wings of the Blue Eagle offer occasional protection for the dishonest and the insincere. . . . This is a free country; freedom of thought and of speech is guaranteed. Certainly, no thinking man can applaud all the events growing out of the recovery movement. Only a blind fanatic could do so—and blind fanaticism doesn't cure depressions.

❖

PERSONALLY, we regret very much that the so-called blanket code, with all its trappings, had to be resorted to. The job of helping individual industries to shape sound programs of action seems to us such a serious task that we dislike to have it cheapened by ballyhoo and super-salesmanship. We wish that job could have gone along on its own. Nevertheless, in all honesty, we do not see how this other phase could have been avoided. Industries which were the first to play ball and get their codes approved were at a disadvantage in the competition against others where wage chiseling was still permitted under the rules of the game. The absence of a nation-wide push toward recovery threatened the eventual success of the whole movement. Something had to be done—and done quickly. It was done. Whether or not we approve of it theoretically, we must admit that it "clicked." The job now is to get over this interim stage as quickly and painlessly as is possible under the circumstances; to guard against hysterical unfairness; and to keep ever in mind the real objective: industrial sanity.

❖

THE one attitude with which we have absolutely no patience is the tendency to condemn the recovery program, in toto, merely because one doesn't agree with certain phases of it. In a few months, steps have been taken to curb the wage-chiseler and to permit industry to organize its forces in the war against unfair trade practices. Some price had to be paid for this. Some mistakes had to be made along the way. . . . It is easy enough to say that the country would have recovered anyway. Such a statement cannot be disproved. Nevertheless, a fair-minded individual will recall that we hadn't made any progress toward recovery; that every previous start had been abortive; that utter chaos ruled last March; and that now, for the first time in four years, the nation as a whole confidently sees a way out. . . . We'll play these, thank you.

Another Milestone in Synthetic Fibers

In one sense, 1933 marks an important anniversary in the synthetic fiber industry. It was just 50 years ago that Dr. Joseph W. Swan used gun cotton to produce a continuous fiber—an achievement not comparable of course with that of Count de Chardonnet, but nevertheless one of the industry's milestones. In a broader sense, however, every year is an important milestone in rayon nowadays. Each seems to mark a new record in production and consumption; new high levels in the quality and versatility of the fibers themselves.

In this Ninth Annual Rayon Year Book Number of TEXTILE WORLD, *we have thrown the spot-light on the progress of the last decade, particularly. The series of articles immediately following (printed on tinted paper for ready identification), reflects, in turn, a series of accomplishments in which both producers and consumers have played a part. More important still, it foreshadows even greater triumphs by chemists, engineers, designers and other technicians in the years immediately ahead.*—Editor.

Rayon Output— U.S. PRODUCT FOR 1933 SET AT 208,000,000 LB.

A TOTAL production of 208,000,000 lb. of rayon and other synthetic fibers in 1933 is estimated by TEXTILE WORLD. This represents an increase of 58% over 1932. Our Manchester correspondent's preliminary estimate of world production is 626,000,000 lb., or 23% more than last year.

If our domestic estimate is approximately correct, it means that this year's output in the United States will be over 23 times that of 1920, the beginning of the synthetic fiber impetus.

The figure of 208,000,000 lb. is based on information supplied to us by firms responsible for 85% of the total production; the balance was estimated. This information revealed that 115,000,000 lb. were produced during the first seven months of this year; and that a production of 93,000,000 lb. was anticipated for the last five.

An interesting check against the figures for the first seven months is furnished by the data on rayon shipments, just released by the *Textile Organon*, published by Tubize Chatillon Corp. Taking that publication's index number of average deliveries to American mills during the first seven months, and translating it to poundage by relating to figures of consumption for the base period (1923-1925), the deliveries of rayon during the seven months were apparently 99,500,000 lb. Since the *Organon* confined its study to the product of the viscose, nitrocellulose and cuprammonium processes, it is evident that the addition of the acetate production would bring this figure to something approximately our own production estimate of 115,000,000 lb.

Nevertheless, it should be emphasized that the total for 1933 is subject to later revision, as business during the balance of the year still has some unknown features.

Even more tentative is the world estimate. Our correspondent submits it as "subject to the usual wide margin of error." The following table of synthetic fiber production by countries in 1933 is particularly interesting in that Japan has definitely usurped second place:

United States	208,000,000 lb.
Japan	81,500,000 lb.
Italy	75,000,000 lb.
Great Britain	73,500,000 lb.
Germany	71,000,000 lb.
France	47,700,000 lb.
Holland	22,000,000 lb.
Switzerland	11,660,000 lb.
Belgium	9,020,000 lb.
Canada	7,685,000 lb.
Others	18,530,000 lb.
Total World Production	625,595,000 lb.

Table I—Synthetic Fiber Production, 1920-1923

	United States			*World*			
1920	9,000,000	1927	75,050,000	1920	50,000,000	1927	267,000,000
1921	18,000,000	1928	97,700,000	1921	65,000,000	1928	345,000,000
1922	26,000,000	1929	123,000,000	1922	80,000,000	1929	404,000,000
1923	35,000,000	1930	119,000,000	1923	97,000,000	1930	417,000,000
1924	38,750,000	1931	144,350,000	1924	141,000,000	1931	470,000,000
1925	52,200,000	1932	131,000,000*	1925	185,000,000	1932	509,000,000
1926	62,575,000	1933	208,000,000**	1926	219,000,000	1933	626,000,000**

*From the *Textile Organon;* all other figures are TEXTILE WORLD's. **Preliminary estimates.

Rayon Is Better . . .

IMPROVEMENTS MADE IN STRENGTH, FINENESS, PLIABILITY, AND OTHER PROPERTIES

◆ ***Many times today we hear the remark, "Rayon is better." But when we ask, "How much is it better and in what ways is it better?" the reply is far from satisfactory. The accompanying article is an attempt to answer this double-barreled question.***

IT WAS approximately ten years ago that rayon first became accepted by the industry as an important textile fiber. Its growth in volume of business since that time has been steady, although its acceptance in the higher grades of merchandise has until rather recently been uncertain and at times discouraging. Now the picture is changing, and the acceptance of rayon garments by people financially able to discriminate marks another milestone in the progress of synthetic fiber.

The reason for this improved acceptance is not so much a breakdown in the sales resistance to an established article as it is a recognition of the remarkable improvement which has been made in rayon fabrics. This improvement is of course partly due to the better knowledge and understanding of rayon gained by the mills and by the builders of the mills' machinery through years of experience, but it is due much more to the advance which has been made in rayon as a raw material.

Three things are necessary to establish any textile material permanently in public favor. They are good appearance, handle, and serviceability. The first two have been gained in rayon by the production of finer deniers and more filaments per denier and by making the yarn less lustrous, giving it more uniform affinity for dyes, and making it more uniform in size with fewer imperfections. As a result, fabrics today are finer, softer, and more pliable, and their appearance is more dependable. Serviceability has been gained by improving the tensile strength of rayon, particularly when wet—rayon's most vulnerable point. More filaments and finer deniers are reducing the slipping of warp and filling threads.

The manner in which the rayon producers have accomplished these results is mainly, although not entirely, one of more accurate control. They have made it more certain that each process is fed exactly the right ingredients, is maintained at just the right temperature, is given the correct time, and is conducted uniformly with the proper mechanical operations. Although in many respects rayon today is no better than the best rayon of ten years ago, better control has raised the average very appreciably.

Tensile Strength—The figures on tensile strength of rayon issued by various testing houses and organizations have always been notoriously irregular and even contradictory, due no doubt to the variations between different lots of the same material, to differences in testing methods, to lack of sufficient material under test for accurate averaging, and to the fact that while some laboratories have been testing average and possibly imperfect rayon, others have been testing hand-picked samples. Nevertheless, a careful study of these reports serves to uncover the existence of a very strong upward trend in the tensile strength of the synthetic-fiber yarns, particularly the viscose and cuprammonium types.

In the case of viscose-process yarn it is clear that during the last ten to fifteen years the average dry tensile strength has increased no less than 30%, and there is evidence to indicate that it has increased nearer 50%. The average wet tensile strength has, during the same period, risen at least 78% and possibly more than 90%.

Of particular interest in this connection is Table I, giving the average strength in grams per denier of the 150-denier rayon turned out by one of the largest viscose-yarn producers. Curves plotted from these figures are shown in Fig. 1. They indicate that the rise has been largely a steady one, and this indication is supported by other figures on which this survey is based.

The manufacture of cuprammonium yarn began in this country late in 1926. Since around the middle of 1927 the average dry tensile strength has increased at least 18% and possibly twice that much, depending on what new and old figures are selected for comparison. Compared with scanty figures on the imported cuprammonium of ten to fifteen years ago, the present American product is higher by over 60%. The average wet strength of American cuprammonium had risen 9% by the end of 1929 and is now nearer 39%. On the basis of early foreign production, it appears to have gained by more than 200%. At latest report, the dry tensile strength averages 2 grams.

Deniers and Filaments—In 1915 the finest rayon yarn which could be produced successfully was 150 denier. Ten years ago deniers as fine as 50 were commercially available in nitrocellulose, and as fine as 45 in acetate; but the big production was still above 120. Even today production is still mainly in deniers of 100 and above, but the 75 denier is increasing rapidly in importance; and more yarn is being produced in the 50 and 45 deniers. Cuprammonium is now commercially available in 40, 30, 25 and even 15 denier.

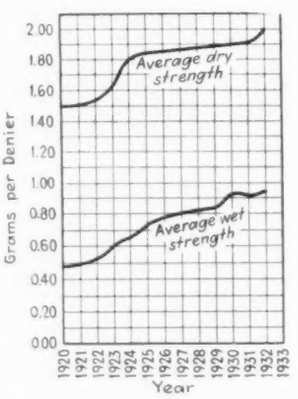


Fig. 1. Chart based on Table I

Table I—Annual Averages of Tensile-Strength Tests Made on the 150-Denier Viscose Rayon of a Large Producer (expressed in grams per denier)

Year	Wet	Dry
1920	.48	1.50
1921	.50	1.52
1922	.52	1.54
1923	.61	1.64
1924	.66	1.81
1925	.74	1.85
1926	.78	1.86
1927	.80	1.87
1928	.83	1.88
1929	.84	1.89
1930	.93	1.90
1931	.92	1.91
1932	.95	2.00

More remarkable than the downward trend in deniers is the upward trend in filaments per denier. Ten years ago the 150-denier viscose and nitrocellulose yarns, for example, did not boast more than 20 filaments, while the equivalent acetate yarns were limited to 40. Today 150-denier viscose can be obtained in 90 filaments; and 150-denier acetate, in 80 filaments. The well-known tables issued periodically by Cox & Fuller, New York, make it convenient to trace this development since 1926, when the first of the tables was compiled. The range of filaments in four yarns which have shown exceptional progress are plotted in Fig. 2.

These figures, however, if unqualified, may give a somewhat exaggerated picture of the development which has taken place in rayon fabrics. It should be pointed out that the common filament counts in most 100- and 150-denier yarns have risen in the last decade from around 16 to between 30 and 60. None of the above figures applies to the cuprammonium yarns, which contained almost as many filaments ten years ago as they do now, the present figure for 150 denier being 112 filaments.

The fact that yarns today contain more filaments than yarns of the same size in 1923 means of course that finer filaments are being produced. The finer filaments are largely responsible for the finer yarns, but they also contribute to the progress of rayon in a more direct manner. They give a softer appearance and handle to the woven or knitted material, affording more pliability and better draping qualities. They make it easier to manipulate the yarn in knitting and other mechanical processes. They give the yarn better covering power. They permit higher twists to be inserted without causing harshness; and where higher twists are not employed, they permit more spreading and flattening of the yarn in the fabric—both results tending to reduce the slipping of warp and filling threads. (In this connection it is interesting to note that the finer yarn deniers are beneficial to the prevention of slipping, since they require more interlacing of the yarns in weaving.) Finer filaments give the yarn more surface area, assisting in better penetration of oils, dyes, and other chemicals. Since the outer portion of a rayon filament is stronger than the center, due to the better orientation of its elements of structure at the wall of the spinneret hole, the higher filament counts have contributed to improved strength.

Elongation and Elasticity—There is considerable confusion among commentators on rayon matters regarding the desirability or undesirability of elongation as a rayon property. The confusion is due partly to the different effects of elongation in the uses to which rayon is put. The knitting trade, for example, which has always been bothered with yarn breaks, seems to prefer that rayon should stretch —permanently, if necessary—when heavily strained, rather than break; while the weaving trade is in constant fear of shiners and recognizes that elongation is a frequent cause of these defects. Another source of confusion is the manner in which the terms "elongation" and "elasticity" are often used loosely and even interchangeably.

Due to the confusion in terminology, to the lack of generally acceptable testing methods, and to the non-existence of adequate data, it is impossible to say what change, if any, has taken place in the very important property of elasticity; unless it is safe to assume, as some evidence indicates to be the case, that elasticity is somewhat proportional to elongation. A comparison of tests made in different years indicates than in some cases there has been an increase in elongation varying from a negligible amount to as high as 22% for dry yarn and 110% for wet yarn. For synthetic-fiber yarns as a whole, however, the change has been too slight to be significant. In many cases strength in rayon is gained at a sacrifice of elongation; and, since we know that the former has been increased, it is not surprising that there has been little increase in the latter. Furthermore, luster control also tends to restrict elongation.

Luster—The general development of low luster in rayon is so recent a development that there is little need to discuss it in detail here. It is one of the major steps in the progress of rayon, but it does not lend itself to reduction to cold figures. Its contribution to rayon's advancement is confined to an improvement in appearance. In some yarns it may be serving to retard the development of higher tensile strengths, and we have already pointed out that it has a tendency to decrease elongation and possibly elasticity.

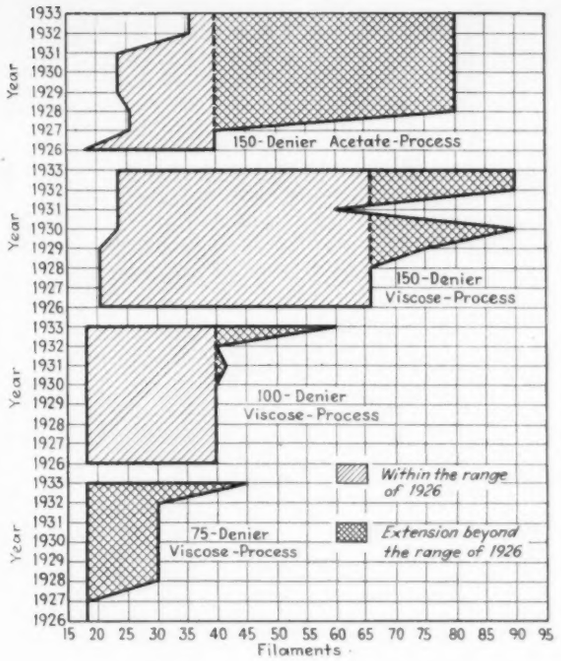


Fig. 2. Range of filaments in four yarns.

Dye Affinity and General Absorptiveness—Uniformity in dye affinity and general absorptiveness has been greatly increased by the improvements which have been made in the uniformity of rayon's physical and chemical structure, through more accurate control in its manufacture. Certain steps have also been taken with the specific object of improving these properties, and careful studies have been made to determine what influences affect them. In the viscose processes, for example, it has been found that important factors include the amount of acid in the coagulating bath, the temperature of that bath, the spinning tension (high tension giving higher strength, lower dye affinity, and lower elongation), length of ripening time for the viscose solution (the longer the time, the less the affinity), etc. Multifilaments, affording more surface area, increase the rate of absorption. Dyestuff manufacturers have aided the work of the dyer by supplying more suitable products. Oil manufacturers have assisted by providing lubricants for finishing the yarn which are less inclined to cause dyeing trouble.

Resistance to Chemicals—The synthetic fibers are more resistant to the action of various chemicals, particularly alkalis, than they were ten years ago, in spite of the fact that the multi-filaments offer more surface for attack. Acetate yarn, for example, is now available which permits the degumming of silk and acetate fabrics at a boil without delustering of the acetate. These improvements, like those made in dye affinity, are partly the result of a critical study of the manufacturing operations. They are also due to less over-bleaching of the raw yarn and to the increased strength of the original yarn before it is subjected to damage.

Resistance to Abrasion—There is little to indicate that rayon is more resistant to abrasion. In fact the multi-filaments may render it less resistant to such action. The many changes which have been made in the methods of testing this property, the lack of uniformity in testing methods at any given period, and the yearly variations in the fabrics themselves render any adequate comparison impossible.

Uniformity and "Quality"—References have been made at various points to the uniformity which has been gained in the different properties. This is nowhere more important than in the case of yarn deniers, filament numbers and filament sizes. Also beneficial to quality has been a drastic reduction in the number of loops, broken filaments, broken ends, and knots. In 1923 the output of the rayon industry which was of inferior grade averaged 10 to 15%. Today this average is no more than 2 to 3%, and in the case of many deniers is less than 1%.

THE YEAR'S TECHNICAL DEVELOPMENTS IN

Rayon Manufacture

By Harold DeWitt Smith, Ch.E., Ph.D., F.T.I.
Textile Technologist, A. M. Tenney Associates, Inc.

◆Great strides in cutting synthetic-fiber production costs during the last decade are responsible in part for the fact that prices are less than one-quarter what they were ten years ago. Spinning speeds, both in spool and pot methods, have been doubled; percentage of seconds has been reduced; recovery of process-chemicals has been improved. The consumer has reaped practical benefit from this progress as well as from the bettered properties of the yarn which are described in another article in this series.

IN seeking the causes for the substantial recovery from the depression years on which the rayon industry has embarked during the past twelve months, the influence of technical developments and improvements cannot be overlooked. Foremost among these developments are the spread of dull-luster yarns and the increasing use of finer deniers and finer filament structures in higher, more silk-like constructions. The latter trend has been markedly accelerated this year by the improvement in the excellence and uniformity of the finer deniers and by the increased skill of users in handling them.

Apart from the welcome improvement in the rayon business, which after all is the ultimate measure of the success of this as of any industry, the year has seen several events whose present importance will undoubtedly be eclipsed by their influence on the future course of the industry. One of these is the partial clarification of the patent situation in two directions. In this country the ownership of the patents for producing dull-luster rayon by the introduction of titanium pigments into the spinning solution has been tested in the courts. Another related suit is pending. Clearing up of this confused situation will undoubtedly further the wider development of this type of yarn as long as the whims of fashion keep dullness in vogue. An interesting court test is nearing conclusion in England over the validity of certain fundamental patents covering the manufacture of cellulose acetate yarn.

Another significant feature of the year is that Japan, which first assumed importance as a producer of rayon less than ten years ago and whose production had reached only 5,000,000 lb. in 1926, has already surpassed every other country except the United States, having reached second place with an output estimated at 81,500,000 lb. for this year. The technical and scientific researches on the various rayon processes which have been carried out in the universities and governmental institutes in Japan show a breadth of scope and a relationship to one another and to the production problem as a whole. It is perfectly clear, therefore, that the rapid expansion in production is based upon a sound foundation of knowledge and that the Japanese product will be able to find a place in the world market on a quality basis.

The drive for reduction in costs has continued this year, but it is very probable that the results have been relatively less than during the two previous years, because the more easily won savings have already been made. It is certain that many of the published and unpublished improvements or short cuts in manufacture have not yet been sufficiently tested by actual large-scale operation because of the lack of plant expansion in recent years.

Viscose Process

With regard to the preparatory processes of viscose manufacture, the patent literature shows that efforts are being made to xanthate the soda cellulose directly without first pressing out the excess caustic soda, and in fact, even to eliminate ageing of the soda cellulose so as to combine the caustic treatment, grinding, xanthating, and dissolving operations in one machine. No evidence of the practical success of such drastic short cuts is available as yet.

Replacement of filtration by a continuous centrifugal purification of the spinning solution which was mentioned in this review several years ago seems to be finding further favor in some quarters.

The pot spinning method is undoubtedly giving way to bobbin spinning because of the increasing spinning speeds and the trend toward finer deniers. Nevertheless new designs of pot spinning machines are being offered, the principal feature of which is a faster traverse to permit a proper build of the cake at the higher spinning speeds. In Germany pot spinning machines are offered with spindle speeds as high as 15,000 r.p.m.

The newer designs of bobbin spinning machines are more compact. For instance, at least one foreign manufacturer has gone back to one bobbin per spinneret instead of two, as has previously been used to insure continuous production while doffing the full bobbins. This continuous operation is now accomplished by one extra spindle at the end of the machine so that the thread transfer can be made from the first full bobbin to this empty one and then to each empty bobbin as replaced in succession. On this machine the distance between the spindles has been reduced to 200 mm., as compared to 230 mm. on the two-spindle automatic doffing machines using the same size bobbins (125 mm.)

Despite continued persistent efforts to develop a satisfactory method of complete aftertreatment in the form of cakes or on spinning bobbins, the practical difficulty of allowing for free shrinkage during these operations seems

to have prevented this short cut from gaining wide acceptance.

The recovery of chemicals, particularly of caustic soda, is certainly becoming more general. By dialysis the exhaust caustic liquor containing 16 to 17% caustic soda is recovered to the extent of about 90% as a 4% solution which is used to dissolve the xanthate and the fresh caustic soda.

Acetate Process

The continued gain in production of acetate yarns is due in large part to their increased acceptance by the weaving trade. If there be any one technical development which can explain the avidity with which the weavers have taken up these yarns, it is the perfection of the dull-luster type. In addition to this particular development, however, is the gradual but steady improvement of the inherent qualities of the acetate yarns.

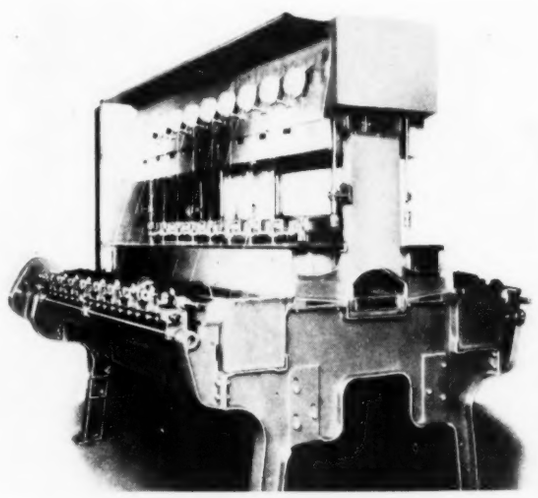
The largest English producer by the acetate process announced last fall a variety of new types of acetate yarns including a spun yarn resembling wool and schappe; an acetate yarn with a greater strength and finer filament structure than that of natural slik; and a yarn which can be dyed and printed like a viscose yarn, while at the same time retaining the desirable physical qualities of the cellulose acetate type.

Except for the spun acetate yarn, these developments apparently have not reached commercial production, in this country at any rate. Spun yarns made from the acetate staple fiber are being woven and marketed in some interesting fabrics, including men's summer suitings. With this evidence that the technical difficulties, which have until recently frustrated attempts to spin acetate fibers, can be overcome, it is safe to predict that the qualities which give the continuous acetate yarns their special place will also insure the rapid expansion in demand for spun acetate yarns. Because of their thermal and other physical properties, it is quite possible that spun acetate yarns may gain a real entry into the field of men's clothing now dominated by wool.

Filament Structure

The properties of rayons are discussed elsewhere in this issue. In this connection, however, an analysis of the table of deniers and filament counts of American rayons published in July 1933 by Cox & Fuller as compared to the last compilation in September 1932 is interesting. Counting bright and dull yarns separately there are 286 different yarns listed in 24 different denier sizes, as compared to 277 yarns in 25 different denier sizes a year ago. Hence there is no evidence of simplification of schedules from the producer's viewpoint. However in eleven cases a higher filament structure has been substituted for a lower one which was previously produced, and in thirteen more cases higher filament structures have been added to deniers already made. Eight yarns (all but one of which have coarser filaments) have been dropped, and eight (most of which are very heavy deniers with fairly coarse filaments) have been added. Thus the trend is strongly in the direction of finer filaments, and this is one of the most important factors in providing the fabric designer and the mill with a material suitable for the fine fabrics which they are producing.

While there is still a demand for filaments as coarse as 6 denier (24 filaments in 150-denier viscose yarn) for certain specific purposes, it is interesting to note that this structure, which only seven years ago represented the upper limit in fineness of most commercial viscose yarn, is today at the lower end of the scale whch shows 40, 60, and even 90 filaments for 150-denier viscose yarn; that is, 3.7 denier, 2.5 denier, and 1.6 denier, respectively. The filament of real silk is abuot 1.3 denier.



Recently developed pot spinning machine designed to speed up production of rayon yarn

New Processes

There has appeared little or no evidence that any new processes have passed the purely experimental stage, despite the usual crop of patents and papers. The four commercial processes still hold the field and of these viscose and the acetate remain the most important.

The cellulose ethers continue to attract interest, but the cost of manufacture apparently remains too high to permit of competition with present processes. Attempts to incorporate nitrogen into the cellulosic materials with the hope of improving dye receptivity to acid and basic colors and improvements in physical properties continue. The former result seems probable, but a near approach to the physical properties of silk or of wool probably will be obtained only by starting with a molecular structure which differs basically from that of cellulose.

An interesting piece of research, reminiscent of the work on butadiene several years ago, is that of Carothers and Hill on true synthetic fibers; that is, fibers built up by the polymerization of relatively simple substances, namely dibasic acids and alcohols. By a combination of polyesters and polyamides they obtained fibrous materials which showed a compromise between the extremes of solubility and fusibility exhibited separately by these two classes. Such work is interesting as an indication of the possibility of truly synthesizing practical textile materials in the future, rather than for any immediate commercial value.

Of greatest interest for the immediate future is the fact that the persistent demand for rayon during the last six months has led to a definite announcement of plans by a number of producers for increasing productive capacity. This installation of new machinery will provide the first real opportunity in almost five years to utilize on a practical commercial scale many of the improvements and developments which have originated since the last period of expansion came to a halt. The design and efficiency of these proposed additions should be radically different from those of most existing plants, and the results obtained will be awaited with keen interest.

EXPANSION OF QUALITY OUTLETS IS 1934 KEYNOTE

IN *Rayon Merchandising*

◆ ***Profitable distribution of textiles is a current aim which is stimulating broader consumption of rayon in old fields and use in some textile divisions previously untouched. This broadening interest plus evidence of price strength make the outlook promising. The widening differential between silk and rayon is lessening direct competition between the two fibers, and improvement in quality of the synthetics has been helpful in establishing them in consumer regard. A new trend is the tendency of viscose and acetate yarns to cross each other's markets with acetate going more into daytime wear and viscose winning popularity in the more formal fabrics. All of these elements have a bearing on the 1934 promotional approach to markets.***

OUT of the maze of radical developments and fundamental changes which complicates the rayon merchandising picture this year, one impression stands out clearly—and this could be epitomized in the single word "progress." Rayon merchandising has very definitely improved its position. The scope and significance of the improvement have so many ramifications that an analysis of it, without examining developments in other divisions of the industry, would be impossible. The true story, indeed, carries us far and wide. Of the year's tumultuous happenings—industrial, economic and social—the rayon industry has had its full share.

Stocks and Prices

Let us first review briefly the market's history. Synthetic yarns had a premature recovery of their own, in August, 1932. Demand leaped to hectic proportions, and if it were not for the low prices, producers and their merchandise executives would have been in clover; as it was, however, the thing proved nothing more than a profitless prosperity. The sole gain was to reduce stocks, which helped materially to improve the market status for the fall months. Demand continued intermittently active through early winter, with the result that at the end of the year, stocks were down to about three weeks' supply. The surplus ran up early last spring, but April saw the start of a shrinkage which continued so steadily that in early August few companies had more than three days' stock on hand.

The price story is yet more encouraging. Through most of the fall and winter, 150-denier viscose yarn sold at 55c. The first hint of a possible advance came on March 4, Inauguration Day, when one producer publicly cancelled a projected price-cut, stating that he saw higher prices coming. He was a bit premature, indeed, because in April 150-denier hit 50c, an all-time low. However, that drop proved to be the end of the decline. Twelve weeks later this yarn, through three advances, had risen to 65c where it now stands. Prices of other synthetic yarns have risen approximately in proportion.

Numerous and varied aspects await clarification before the industry can fully benefit from this improvement in sales and prices. The changes involved in the industry's adjustment to NRA operation, the processing tax uncertainties, the vertical integration trend, and the tendency of viscose and acetate yarns to cross each other's markets, —all these bear closely upon the merchandising outlook.

Up to a month ago, stocks in the industry were abnormally low. High-pressure demand since April had reduced carry-over to a negligible point. Discounting much of their business on the basis of expected cancellations, producers booked orders well in excess of plant capacity, and when customers failed to cancel, a shortage developed.

Changing Relationships

In the field of market expansion, easily the most significant aspect is the changing relationship between viscose and cellulose acetate outlets. These yarns are rapidly approaching each other's apparel uses, acetate going more and more into daytime wear, and viscose, through development of finer yarns, tending toward more formal apparel. It is conceivable that this trend may become an issue next year, necessitating some readjustment of promotional approach.

With respect to the advent of NRA operation, the rayon merchandiser finds himself looking two ways—inwardly, at his own industry, and outwardly, at the consuming markets. The yarn producers themselves are adjusting rapidly to the new order. The code submitted by the majority of the industry was signed by President Roosevelt Aug. 27, and even before it had been signed, most of its major provisions were in effect at the plants of these producers. The rayon weavers are now operating under their own code, and to the yarn merchandiser, the effect of NRA administration on this group is a matter of major interest, since the weavers represent a dominant outlet for synthetic.

Vertical Integration

Most significant in terms of selling policy, is the growing tendency toward vertical integration. With the news some months ago that the Tubize Chatillon Corp. had followed the Industrial Rayon Corp. and the Celanese Corp. into the field of fabric manufacture, merchandise managers are studying the question of what changes this may bring in distribution methods. Opinions differ in the industry on vertical integration as a principle, but it is generally believed that the steps taken in that direction so far have been justified by conditions. One basic reason

behind the entry of producers into the knitted fabric field has been the manufacture of inferior rayon underwear fabric, long prevalent, which threatened for a time to prejudice the consuming public against all synthetics. As a step to eliminate the inferior fabric evil, the trend toward installation of knitting equipment and purchase of knitting plants is welcomed heartily by the industry. It is understood that other producers are considering moves in this direction, but indications are that definite action if such is taken, will be deferred until the industry has adjusted itself to the current changes.

Expansion of Outlets

Important progress has been made in yarn development and in the expansion of outlets. Technicians have concentrated chiefly on increasing the uniformity of yarn quality, and on subduing the luster. Fashion has demanded dull-luster yarns, and these types have been dominant in sales of most producers. Easily the most striking feature at this end has been the increased call for acetates; rising silk prices stimulated demand for these yarns, and opened many new markets, especially in sport goods. So thoroughly has acetate become established in this division, that recently acetate-and-silk fabrics were selling above the all-silk fabrics in the same market.

Acetates, mixed with other synthetic yarns, were introduced in a wide range of ribbed fabrics which proved popular this year and the yarn also won increased favor in knitted street-dress fabrics. Interesting underwear developments included a lightweight garment made of acetate and Lastex yarn which was developed in cooperation with the Celanese Corp. Probably the most important single development by Celanese, however, was the introduction of men's summer suitings. Tying in with the new masculine trend toward lightweight summer wear, these goods attracted considerable attention in the ready-to-wear trade and are expected to be a highlight next year. Production of these fabrics was limited this year, but such merchandise as was available sold spiritedly in quality stores. The prices of the suits ran between $20 and $25.

Evening gown of Darweave made by Rudolf Gowns, Inc., (design copyrighted). The fabric is a fancy broken cord, the cord running warpwise but broken into small diagonal sections. It is made from Acele of the DuPont Rayon Co.

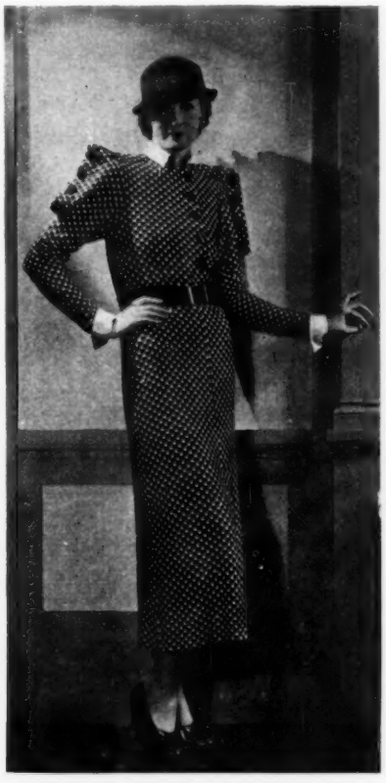
More recent but equally significant in its promise for 1934 is the new "Korospun," a wool-like knitted fabric, made of 100-denier viscose yarn, which was developed in cooperation with the Viscose Co. The fabric is available in herringbones, checks and other effects, both black-and-white and in color. It simulates the animal product to a surprising degree, having both the hand and appearance of a lightweight wool.

Development of new uses was confined largely to further exploitation of existing yarns. Few, if any new specialty yarns were introduced. The cry for dull-luster helped build popularity for the finer denier viscose yarns. Producers selling both viscose and acetate reported occasional cases of customers changing from acetate to the dull-luster viscose. The work done by producers to improve yarn quality has been notable; some indeed assert they have raised the standard of yarns to such a point that today's sub-standard output equals the first quality yarns of several years ago.

A Promising Picture

Such, then is the rayon merchandising picture for 1933-1934. If we have seemed to go far afield at times, it is because numerous revolutionary changes bear definitely on the sales program, and the outlook must be interpreted in terms of their relation to the market. Some degree of inflation appears to be on the horizon, and considering the last four years, it can scarcely be unwelcome. With new markets opening on all sides, prices rising to profitable levels, and silk well removed by its differential from the competitive stage, rayon's merchandising outlook for 1934 is decidedly promising.

Dress of Korospun, a new fabric sponsored by Edwin I. Golding, Inc., New York. The fabric is knitted from Crown Brand yarns of the Viscose Co., and has the appearance of a yarn dyed wool cloth with duvetyn face. The fabric is printed in a variety of effects.



REDUCED OPERATING COSTS MARK PROGRESS IN

Rayon Throwing

By Stewart H. Gilston

◆ ***Shiners, knots and broken filaments worked mischief in the early days of rayon throwing. The throwster's contributions to fabric quality have been elimination of these defects and delivery to weavers of better-running yarn. At the same time improved throwing methods and better equipment have reduced waste, speeded production and decreased costs.***

EFFORTS of the rayon throwster to reduce operating costs have continued unabated during the last twelve months. As a result the progress in this direction noted a year ago has been uninterrupted. Quality of the thrown yarn has, at the same time, been improved.

Introduction of the 30,000-yd. skein has enabled a saving in winding costs on both natural and bleached yarns. Mills using this skein have found an operative can handle more spindles. Therefore it has been possible to reduce piece-work rates and still allow the operative to make the same pay. Shuttles have been changed to handle long bobbins, in place of short bobbins or cops, thus cutting weaving and quill-winding costs.

Some of the more enterprising mills weaving rayon constructions in which shiners are unnoticeable have gone a step further in reducing filling costs. For years nearly every cotton mill has had at least one spinning frame which it has modified for making filling. This modification was accomplished by slowing down the cylinder, speeding up the traverse, placing stationary guides on the traverse rail, and installing some sort of tension and creel for the yarn.

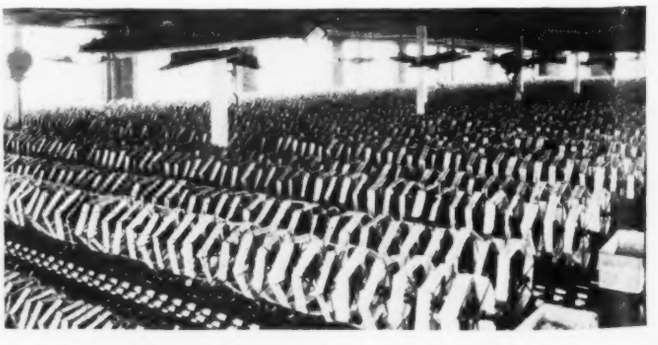
Recently the writer had brought to his attention an innovation in converted-spinning-frame winders. With this equipment the delivery is from cones on bleached yarns and cone-shaped spools on dyed yarns. Over-end delivery avoids the excessive tension experienced with side delivery when the traverse reaches the large diameter of the bobbin. Individual tensions on a revolving shaft consist of two disks, one being backed up by a spring and adjustment unit. Enameled screw-eyes on the traverse rail are replaced by a small fiber wheel so that no cutting will occur at this point of heavy tension at right angles. The spindles are tape driven, for at low spindle speeds and heavy tension, band slippage is too great. With the spindles being driven uniformly in connection with a four-point tie-on traverse cam, however, the results are a firm bobbin, fast traverse, good taper, even diameters, and therefore a bobbin which weaves well. One operative handling one frame of 256 spindles produces 160 lb. daily, which is nearly double the production of a girl on a quill winder.

Yarn for samples which stands on bobbins awaiting sample warps often softens, so that a large amount of yarn is wasted and many bad picks are made. To overcome this, one mill had a piece of screening cut to fit over a pin board of bobbins so that the board can be inverted without the bobbins falling off. The bobbins are dipped in a very light size and, when dry, can be set aside indefinitely, but still be woven as though freshly wound.

Silk mills adhere to their warping mills, and many cotton mills which started warping rayon by the cotton system have turned to warping mills. However, many have returned to the cotton system, using high-speed warpers with magazine cone creels, or converting low-speed cotton warpers with spool creels. Conversion is accomplished by replacing the mechanical stop motion with a loom-type electrical stop motion, as its action is quicker and the light drop wires afford less chafe on the yarn. The stop motion actuates an electric door opener which serves as a latch to hold the treadle down when all the ends are in place. The creel is closed to take the smaller warping spools, the cylinder covered with canvas or felt to prevent bruising the yarn, a lease comb substituted for the regular comb, and the cylinder cut down to 42 or 44 in. so that the sheet of yarn going into the slasher is about the same width as the sized yarn sheet.

Several years ago, when rayon was being adopted for cotton-mill uses, the cotton section beams holding the rayon were placed behind the cotton slasher in the same manner as in handling cotton. The ends of the second beam passed around the first beam, those of the third beam under the second and over the first, etc., so that a lease could be taken. In a short time section beams behind the slasher were elevated so that the yarn sheet from one beam passed over the beams in front of it. This arrangement made a lease impossible, and the ends were kept straight on the loom beam by gummed paper.

It has now been found that in some cases where the slasher always handles the same number of ends, it is well to lease the section beams top and bottom and draw each beam through a reed of proper width in such a manner that there is one end from each beam to a dent. When the section beams run out and the new set of beams is put in place, the lease on the first beam is twisted to the corresponding lease in the reed and the other beams of the set are treated in a similar manner. Since it is unnecessary to disturb the ends in the expansion comb in the front of the slasher, the time lost twisting-in is gained by not laying in the expansion comb.



LARGER SKEINS AND CONES INFLUENCE HANDLING OF

Rayon in Cotton Mills

By Philip Allen

◆ ***From four million to over fifty million pounds in ten years is the dramatic gain of rayon consumption by cotton mills. Synthetic fibers were first used merely as a decoration in voiles, lawns, madras, etc., while now piece goods in great variety and volume are made of cotton-rayon or all-rayon construction. Increase in use has been paralleled on similar impressive scale by improvement in mill methods. Warpers, slashers, looms, etc., specially designed to handle rayon have been substituted for the cotton machinery originally employed, resulting in lower production cost and higher fabric quality.***

OUTSTANDING among the recent developments which influence the handling of rayon in the cotton mill are the introduction of the 30,000-yd. skein and the increased use of rayon in the form of prepared cones for quantity production. The larger skeins and cones now available have resulted in lower costs and have made for better winding, twisting, and weaving.

The new skein, which was developed by one of the leading yarn producers, has many advantages over the older 10,000-yd. skein. From the standpoint of skein winding, added spindles can be offered to each operative, due to the elimination of excessive breakage and continuous run-outs. This tends to increase production and decrease costs. The weavers have an advantage in receiving practically knotless filling from these skeins. This results in fewer shiners, thereby cutting down the seconds in the cloth room. To the writer's knowledge, the one slight disadvantage of the larger skeins is the necessity of training winding operatives in handling them and properly placing them on swifts.

For quantity production, the use of rayon in the form of a prepared cone has several advantages. Thus the yarn, received in plywood cases, is wrapped in a wax-paper covering, assuring no opportunity for rough handling. The cones are placed directly on twisting frames, eliminating not only skein winding, with its opportunity of excessive waste, but also the further chance of mixing rayon of different brands on the winders. In addition, all winder knots are avoided and winding costs are eliminated.

What might be considered a disadvantage is the necessity of putting cone yarn on spools for silk twisters. This necessitates the winding of the yarn from cone to spool by means of an ordinary winding frame. To do this work inexpensively yet effectively, the writer suggests two possible methods.

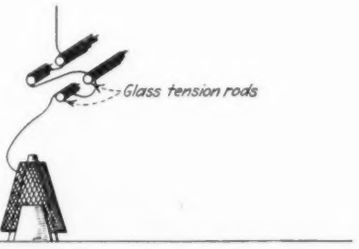


Fig. 1. Arrangement of tension rods in winding from cones to spools

Fig. 2. Platform for holding cones to prevent contact with floor

In the first process, the yarn is brought up and wound around a metal swift which revolves with the pull of the friction-driven spool. This affords a steady, even tension, which may be varied according to the size of the yarn by increasing or decreasing the number of times which the yarn is wrapped around the swift.

In the second method, the yarn is delivered to the spool by means of a series of glass tension rods, through which the yarn is threaded, as illustrated in Fig. 1. This second method avoids dirty yarn and splitting of delicate filaments. Although it involves a greater initial investment, it will repay the mill in a short time with high-quality work. In some cases it may be desirable to have a porcelain (or other smooth, non-chafing) eye fastened to the knee boards of the winding frame to eliminate undue strain on the yarn and to help balloon the yarn end from the cone and center it as much as possible on the tension rods. Extreme care should be taken that the balloon eyes are centered directly over the center point of the upright cone, thus preventing chafing of the yarn on the knee board or any other point of contact.

Whichever method is used, the platform shown in Fig. 2 can be built to keep the cones from the floor and to permit best delivery of the yarn from the cones. One precaution should be mentioned. As is true in all winding operations, guides must be carefully checked at frequent intervals, and any which are channeled must be replaced.

WIDE CHOICE OF MATERIALS NOW AVAILABLE FOR

Sizing Rayon Warps

By D. A. Gryder

◆ ***When rayon was first introduced to cotton mills it was run with little if any sizing. The only satisfactory way in which it could be woven as warp was by doubling. In a natural sequence, cotton slashing methods were adapted on rayon warps but were not entirely successful. Within the last ten years, sizing equipment designed specifically for handling synthetic yarns has been developed. Also increased use has been made of sizing materials hitherto not generally employed. As a result of this progress, weaving has been improved and difficulties formerly encountered in finishing have been eliminated.***

WITHIN the last year radical changes have been made in the sizing of rayon, especially in the choice of materials used for sizing purposes. These changes were brought about by the demand for the new rough and fancy rayon and acetate crepes and by the inability of the finisher to get the proper drape and feel on goods sized with the materials formerly employed.

Today many different substances are employed for sizing; and the tendency is to use an even wider range of materials in an effort to produce new and novel finishes.

Four Requisites

A suitable sizing compound must fill four requisites: It must be economical to use, it must have good slashing qualities, it must be satisfactory for weaving, and it must be able to be easily removed in finishing.

There is no one sizing formula suitable for all yarns which incorporates all that is ideal. Therefore, it is essential that a size be chosen with the best attributes possible. Since viscose, nitrocellulose, cuprammonium, and acetate yarns have somewhat different characteristics, special formulas for each must be used at the slasher.

For example, acetate yarn is extremely resistant to water, and the aim with this material is to form a protective coating around the filaments, rather than to depend on penetration for strength; accordingly, this type of yarn must be sized with a stronger solution than is needed for the others.

Since proper choice and use of a sizing medium depends on a knowledge of its characteristics, it is essential to consider briefly the properties of the various substances in most common use.

Because of their wide use in sizing and finishing textiles, it is logical first to discuss starch and its related products. Starch as a sizing agent is excellent from the standpoint of weaving. It is easily applied and is economical to use. Perhaps the most serious drawback to the use of starch sizes is the fact that the finisher finds it necessary to resort to an additional operation to remove the size from the fabric. It is an established fact that the longer rayon fibers are subjected to water and chemical solutions, the greater is the liability of loss in their strength and other natural qualities. Therefore, the added process of desizing is not only an extra expense, but often makes it difficult to obtain the proper finish.

Thin-Boiling Starches

The thin-boiling starches are somewhat different from raw starches in their properties. In their preparation raw starches are treated with hydrochloric acid, forming carbohydrate products with a composition between glucose and starch. The adhesiveness and jellying properties of the raw starches are modified somewhat by this treatment; and often the thin-boiling is used in conjunction with some other material to give body and strength. This is not always true, however, and a typical formula for sizing viscose consists of 15 to 20 lb. of thin-boiling starch and 2 to 3 lb. of softener to 50 gal. of water. This bath is brought to the boil and boiled for 10 min. It is then allowed to cool to 140 to 150° F., at which temperature it is applied.

British gum and dextrin have their greatest value as finishing agents, but are frequently employed in the preparation of plastic sizes with gums and gelatin.

Vegetable gums are products from plants and trees, and heretofore have been given comparatively little attention as sizing mediums for synthetic-fiber yarns. True gums consist principally of arabin, cerasin, and bassarin. The most frequently used of these natural gums are gum arabic, gum tragacanth, gum tragasol, senegal, and Indian gum. Of these, gum arabic, gum tragacanth, and gum tragasol are most important. These gums have good sizing qualities and are powerful thickening agents. They are somewhat difficult to get into solution, and are not so easily removed as is desired.

For this reason, at present, they are not so extensively used for sizing purposes as might be expected.

Glue and Gelatin

In the last year animal glue and gelatin have been widely adopted as sizing mediums for viscose, acetate, etc. Glue and gelatin are prepared from the same raw product, namely, the bone and skin of animals. They are both nitrogenous compounds with like chemical structure, and the only difference between the two is the method of manufacturing and grading, gelatin being the higher grade of the two products. Until recently the value of glue and gelatin for sizing was little known. However, it is now recognized that they combine to a high degree the requirements for a good size, as specified above. A high-grade, hide gelatin is soluble in warm water, and can be removed from the fabric by ordinary scouring methods and without recourse to special desizing processes.

On viscose, gelatin-base sizes are usually employed in the proportion of 1 part of size to 8 to 12 parts of water, depending on the yarn size and sley. On acetate yarns a more concentrated solution is necessary, and as a rule about 1 part of size to 2 parts of water is found satisfactory.

Other Compounds

There are several other compounds that have been used for sizing rayon and other synthetic yarns. Casein glue is, perhaps, the more important of these compounds; however, it has not received so much attention as gelatin for sizing purposes, due to its water-resistant qualities and its lack of solubility. Linseed oil is another material which has been employed to a certain extent; but it is not often recommended, as it is an oxidizing oil and is difficult to remove from a sized yarn.

In addition to the adhesive employed in sizing, it is necessary to use a softener which will make the warp pliable. A sulphonated oil or glycerin, or a combination of the two, is often employed as the softener. The sulphonated oils are usually made from castor oil, olive oil, coconut oil, or mixtures of these. Tallow is also used as a softener, particularly when starch is employed as the adhesive.

There are available prepared sizing compounds which contain both an adhesive and a softener. With these compounds all that is necessary is to add hot water, mix well, and use. If a prepared size is employed, it is essential to choose one that combines as far as possible all the qualities specified above.

Successful use of a sizing compound depends largely on the method of application. The quantity of size used, the temperature at which it is applied, the temperature of the drying cylinders, and the yards per minute delivered are seldom alike in any two mills, each mill setting up its own standard, according to the type of machine used for slashing. There are, however, a few general principles in slashing rayon which should be recognized and followed.

Method of Application

For yarns of the regenerated-cellulose type the temperature of the size should be 140 to 150° F. at the time of application, and for an even size this temperature should be maintained throughout the length of the warp. For acetate yarns the temperature of the size should be about 160° F. at the time of application in order to insure better penetration and more even sizing of the filaments.

There are some authorities who advocate sizing viscose yarns with a dry nip, rather than drawing them directly through the size solution. This is due to the fact that viscose is very absorbent and is highly susceptible to stretching when wet. However, there are others who draw the yarn directly through the size and apparently get very good results. Acetate yarns are usually run directly through the size solution or are sized with a wet nip.

The speed at which the warp is run depends upon the weight of the warp and strength of the sizing solution, as well as upon the temperature of the drying cylinder. Usually the speed is from 15 to 20 yd. per minute. The temperature of the drying cylinders should be 175 to 200° F. for the first and second cylinders and may register 220° F. or above for the other three cylinders if a five-cylinder machine is being used. To keep these temperatures, steam pressures of 5 and 15 lb., respectively, are usually required. It is essential that acetate warps be dried at lower temperatures to prevent injury to the surface of the yarn. This usually slows down the drying of acetate warps.

Elongation or stretch is determined by the amount of tension applied to the warp during slashing. It should be pointed out, however, that the weight of the section beams causes considerable stretching of the wet yarn. An elongation of 8 to 10% is usually desired for viscose and somewhat less for acetate. On the other hand, some mills do not want an elongation of over 4%. To insure good running of the warp behind the size box, it is essential that as little tension as possible to give the required stretch be applied.

Charles B. Johnson

Battery of sizing machines running on rayon warps.

Improved Finishes

ATTEST TO ADVANCES IN PROCESSING RAYON YARNS AND FABRICS

◆ ***Ten years ago rayon was processed much as though it were cotton. At that time introduction of acetate yarn was just beginning in this country, and the special dyestuffs and procedure for handling this class of synthetics were virtually unknown. Steady progress in processes, rayon yarns and fabrics, has culminated lately in the introduction of equipment and methods designed primarily for these materials. Thus one decade encompasses the whole art and science of dyeing, bleaching and finishing synthetic fibers.***

PREEMINENT among the year's development in textile processing of rayon, the commercial production of anti-crease fabrics is, however, but one manifestation of the progress which is being made in the bleaching, dyeing, and finishing of rayon yarns and fabrics. During the last twelve months efforts have concentrated largely on improving the quality of finished materials. At the same time, increased use of synthetic yarns in weaving and knitting has hastened the perfection of methods and equipment for treating rayon fabrics in quantity. Some of the improvements already in evidence and lines along which further progress may be expected in the near future are discussed briefly in the following paragraphs.

The anti-crease process for rayon (and cotton) fabrics developed in England by Tootal, Broadhurst & Lee, and first announced about a year ago, is now being employed in three of the larger finishing plants in this country. Not only does the anti-crease treatment render rayon fabrics less susceptible to creasing or crushing, but it also reduces the extensibility of the yarn and increases the breaking strength, particularly when wet. In addition, it lessens the tendency toward slippage of warp and filling threads exhibited by many rayon fabrics.

Anti-Crease Process

Essentially, the anti-crease process consists of treating the fabric with a mixture of urea, formaldehyde, and other chemicals in such a way as to form an insoluble synthetic resin within the individual fibers. Although the weight of the goods is increased about 15% by this treatment, the appearance of anti-crease fabrics and those finished by usual methods is substantially the same. It is not amiss to recall that the anti-crease process was not hit upon by chance, but is the direct result of long and earnest research intelligently directed.

Progress made by the manufacturers of synthetic fibers in the production of pigmented and other low-luster yarns makes it less necessary for the dyer and finisher to employ delustering processes. Accordingly, in the last twelve months the search for new delustrants and efforts to perfect delustering treatments suitable for use in the textile plant have not been as strenuous as they were in the past.

While the demand for rayon materials having a subdued luster has continued, there has also been a call for chiffons and other fabrics with a pronounced glazed effect—the so-called lacquer finish. Strictly, the term "lacquer" as used in this connection is a misnomer, since the finishing materials ordinarily employed are water-soluble substances, of which gum arabic is typical. It is an apt descriptive term, however, as the appearance of the fabric is such as might be obtained if a light coating of a transparent high-luster lacquer were applied to the face of the fabric. Since the chemicals commonly used to produce this finish are soluble in water, the effect is lost when the fabric is laundered. It should be possible to develop a procedure which will give a finish similar in appearance and at the same time be resistant to washing. Such a process would be a distinct improvement over those originally employed.

Another interesting innovation is the method developed by a well-known silk finisher for producing a fabric of the matelassé type. This material, known as Cloque, is obtained by gluing a crepe to the back of a flat fabric, such as a cotton voile, and then embossing the duplex fabric.

Spray Finishing

For imparting a face-finish to crepes and other rayon fabrics, spray finishing has found favor. In this process the finishing solution is applied to the face of the fabric in the form of a fine spray or mist. The goods are then wound on rolls, either before or after drying, according to the nature of the finish and the character of the fabric. It appears that spray printing has advantages which recommend its more general application.

Use of Cellophane in the fabrication of textiles is a growing trend; and this material is now being employed in the manufacture of knit goods, is being laminated to various constructions of cotton and rayon piece goods to produce a transparent facing, and in strip form is being woven in conjunction with other materials. Cellulose acetate is now available in sheet form, and there seem to be no reasons why this cannot be used in much the same manner as is Cellophane. More extensive use of products of this type in the fabrication of textiles may bring new problems to the dyer and finisher.

In the past, starches and their derivatives were employed quite generally in the sizing of rayon warps. As a result, before bleaching or dyeing, it was necessary to treat rayon-warp fabrics with a desizing agent having amyloclastic properties. At present, however, gelatin and other water-soluble materials are being used to a

considerable extent for sizing rayon and other synthetic yarns. Therefore it is advisable to test each lot of goods with a dilute solution of iodine before it is put into process in order to determine whether or not a special desizing treatment is necessary.

Miscellaneous finishing operations, such as flameproofing, waterproofing, spot-proofing, iron-proofing, etc., have come in for their share of attention; and a number of new compounds for use in these processes have been announced. Further technical improvements and more aggressive merchandising should increase the demand for special finishes of this nature.

Dyeing and Printing

Gradual improvement, rather than radical change, typifies the progress in dyeing and printing. The range of level-dyeing colors for viscose has been extended, several new dischargeable developed colors have been brought out, the list of dyes for acetate yarn has been increased, and printing gums have been further refined. Research has continued on the absorption of dyestuffs by viscose yarn, the level-dyeing of cotton-viscose mixtures, etc. Studies concluded within the last year, as well as those reported previously, have added greatly to our knowledge of the principles underlying the dyeing of the synthetic fibers. On the other hand, little real investigation has yet been conducted under the actual conditions encountered in plant operation. Thus, a study of the pad-dyeing of, say, a cotton-viscose fabric under varying conditions of time; pressure of squeeze rolls; temperature, concentration, and volume of bath, etc., would yield information of immediate practical value.

In recent months there has been a marked increase in the use of the sulphonated fatty alcohols in the processing of rayon. Compounds of this type have proved effective in scouring, dyeing, and finishing rayon yarns and fabrics and in washing rayon prints to produce clear backgrounds. They have found use also in pasting acetate dyestuffs and in other miscellaneous applications.

Engineering Problems

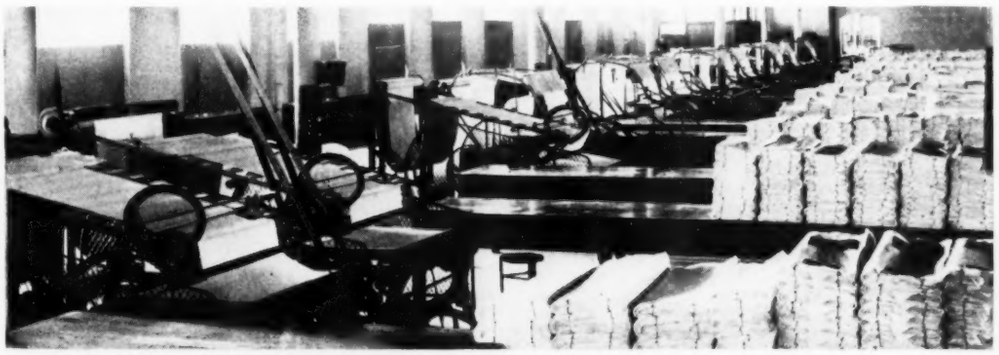
Engineering problems encountered by the rayon processor which have been attacked during the last year include the provision of an adequate supply of pure water and the disposal of dyehouse waste. In the first instance, the installation of an activated-carbon filter in conjunction with an electro-chemical feed and zeolite softeners has permitted the use of pond water, which—in the raw state—has a turbidity of 15, hardness of 35, and an objectionable aromatic odor due to extensive algae growth in the pond. In the second case, use of a mixture of ferrous sulphate and lime has proved effective in the treatment of dyehouse waste which is badly contaminated with mineral oil removed from rayon knit goods during the scouring operation.

Equipment for processing rayon has undergone notable improvement during the last year. While in most instances these newer developments have as their major object the improvement of quality of the finished product, there is shown also a tendency toward higher production speeds, particularly by the introduction of machines which make it possible to substitute continuous for intermittent processes. Brief mention of a few of the new types of processing equipment announced recently will serve to illustrate these trends.

Improved Equipment

For dyeing woven fabrics, an all-electric jig has been designed to give constant cloth speed and tension, and in that way to afford finished work of a better quality and at a higher speed than can be obtained with older types. Likewise has been developed a padder, radically different in construction from the usual forms; this machine has an air-tight dye chamber, spray-printing attachment which permits production of a wide variety of novelty effects, and threading arrangement to minimize drag or tension on delicate fabrics.

Suitable for handling circular knit fabrics is a new type of equipment which enables scouring, fulling, and dyeing to be carried out consecutively without removing the goods from the machine. In addition to reducing the time required for processing, this machine is designed to eliminate chafe marks and stretching and to promote even dyeing. Steaming, tentering, and finishing of tubular-knit fabrics in one operation is made possible through the use of equipment brought out late last fall.



Efforts have continued to develop machinery for handling rayon crepes continuously; and early this year equipment for that purpose was announced. Similarly, there has been developed in England a machine which has been employed for delustering of rayon fabrics continuously and is believed to be suitable for scouring in open width.

As is shown elsewhere in this issue, the rayon manufacturers have made noticeable progress toward increasing the breaking strength of the synthetic yarns. At the same time efforts in the same direction have been made by the finisher; but, except as noted above, with less success. Recent investigations indicate, however, that treatment of viscose rayon with one of the aromatic aldehydes may have beneficial results. In conclusion then, we commend this as a field where further research may prove profitable both to the finisher and consumer of rayon.

Fig. 1. A 260-needle hose of bright viscose

Fig. 2. A 260-needle hose of dull viscose

By Carl Epps

Rayon in Hosiery

BENEFITS PARTICULARLY FROM DULL LUSTER

◆ ***Hosiery, although subjected to more severe wear than most other textiles, is usually purchased on its appearance. Hence dull luster, finer filaments, and the development of ingenious cross-dyed effects are of prime importance to the hosiery field. The finer filaments also afford a mechanical advantage in better pliability which is beneficial to the yarn's behavior under the extreme flexing to which it is subjected in the knitting operation. It is possible that in the long run improvements made in the strength of rayon will prove the most important benefit.***

CONTROL of luster, in the writer's opinion, has been of more benefit to the knitting industry than any other improvement made in rayon during recent years. Next to luster control ranks the increased fineness of filament, contributing softness and covering power. Also of importance are increased strength, greater freedom from flaws, greater regularity in dyeing, finer yarn counts, and more suitable yarn packages.

Still fresh in our minds are the bright, shiny yarns which were so undesirable for certain types of hosiery. At Fig. 1 is a women's 260-needle stocking knitted from bright viscose, contrasting with the dull viscose of Fig. 2.

Different producers have their individual methods of permanent luster control. However, in its simplest form luster control means the development of an irregular outside surface on the filaments so that light is irregularly reflected or absorbed, as compared with the smooth surface of the bright yarns which reflect light directly.

Pigment delustering control obtained by mixing a minutely fine powder with the spinning solution has proved a particularly desirable luster-control method. This method, first used in nitrocellulose yarn, is now employed by most producers. Extra-dull yarns are made in this manner. Semi-lustrous yarns are obtained by mixing some finely dispersed liquid substance with the spinning solution, which prevents the formation of a smooth surface on the outside of the filaments when spun. Oils, soaps, and various other substances are employed by different producers for this control. Figs. 3 to 8 give some idea of the effect of luster control.

Viscose, nitrocellulose, and cuprammonium yarns, having dyeing properties similar to those of the natural vegetable fibers, are particularly suitable for use in men's women's and other classes of hosiery in which cotton is used and which therefore require union dyeing. However, these yarns in combination with acetate, wool, or silk permit ingenious and economical cross-dyeing effects and, if used with both acetate and wool or silk in the same stocking, permit three colors to be applied simultaneously in the same bath. Sometimes the various yarns are mixed largely to provide a certain feel, wear, or

quality; and in such cases it is usually possible to dye with union colors, although this is seldom done.

More desirable effects are now being attained on goods knit in the gray and dyed in the piece than ever before. However, in spite of the fact that much ingrain work can be duplicated by cross dyeing, there remains a distinctiveness in certain classes of ingrain merchandise which well justifies the added cost of production and secures the prices necessary. Figs. 9 to 11 inclusive are examples of half hose knit in the gray and dyed in the piece. They illustrate the diversified construction and design and the dyeing flexibility which are possible.

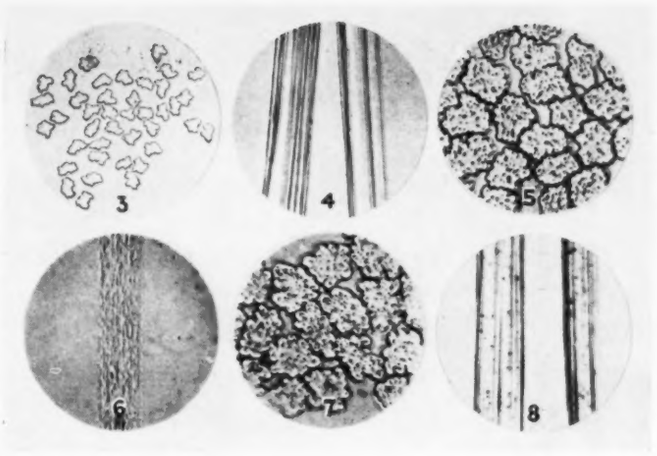
Fig. 9 is a reverse-plated number made on a Standard machine from 150-denier viscose rayon plated over 100-denier fugitive-tinted acetate. It is dyed gray and white in one bath. Before the developments of recent years in acetate and its dyes, this cross-dyed effect could of course be obtained with the use of silk, at greater expense, or could be knitted ingrain.

The body of Fig. 10 is constructed of rayon and acetate yarns twisted together, and the wrap clock is a color and white acetate. Until recent developments in dyes, machinery, and acetate yarn itself, such piece-dyed numbers were unknown. This hose was knitted on a Scott & Williams E.S. machine.

The body of Fig. 11, which was knitted on a Banner reinforced vertical machine, consists of worsted twisted with viscose; and the clock is composed of resist-dyed spun silk. The improved properties of viscose yarn contribute much to fine-gage knitting of such constructions, as does also the improved adaptation of machinery. This number made ingrain or otherwise would be a more expensive construction.

The finishing treatment of rayon manufacture has always been a major consideration in the use of rayon. Properly made yarn improperly finished for a certain requirement does not run satisfactorily. Furthermore, the finishing treatment on the yarn must take into consideration the finishing problems of the yarn consumer. Oiled yarns may run best but not finish best. In recognition of these facts much progress has been made within the last few years along the lines of finishing treatments to meet the requirements of certain classes of work. These improvements include the adoption of self-scouring-oil treatments, emulsifiable-oil treatments, and secret treatments without oil, as well as the plain-finish treatment—the selection depending on the particular requirements of the user.

To the full-fashioned hosiery manufacturer rayon has been of little interest, and only a few manufacturers in cooperation with producers have entered into this field; but with higher silk prices and other factors I am quite sure that what is now an opportunity may later become a necessity.



Group of rayon photomicrographs—Fig. 3. Cross-section of bright-viscose yarn. Fig. 4. Longitudinal view of bright viscose. Fig. 5. Oil-delustered soft-luster viscose; note oil globules. Fig. 6. Longitudinal view of oil-delustered viscose; note irregular surface caused by globules. Fig. 7. Pigmented dull-luster viscose; note particles of pigment. Fig. 8. Longitudinal view of pigmented viscose; note particles.

Fig. 9. Reverse-plated cross-dyed half hose of viscose and acetate

Fig. 10. Cross-dyed rayon and acetate twist with color and white acetate wrap clock

Fig. 11. Cross-dyed worsted and rayon twist with resist-dyed spun-silk wrap clock

◆ ***In the heavy underwear vogue of twenty years ago, rayon had little chance; but the underwear trade, with the trend to lighter garments, became by 1927 the largest consumer of the fiber. It lost that position to the cotton trade in 1931, but it is still a major outlet for rayon. Underwear knitters, experienced in handling large volumes of the yarn and equipped with machines now well adapted to its use, are in excellent position to capitalize on the improvements in its properties. The principal retarding factor in development of broader consumer acceptance is the willful production of inferior fabrics to beat a price.***

Rayon Underwear

NEW KNITTING TECHNIC EMBRACES LARGER CONES, MAGAZINE FEED, ETC.

By Jack Turner
Superintendent, Belle Knitting Mills, Lebanon, Pa.

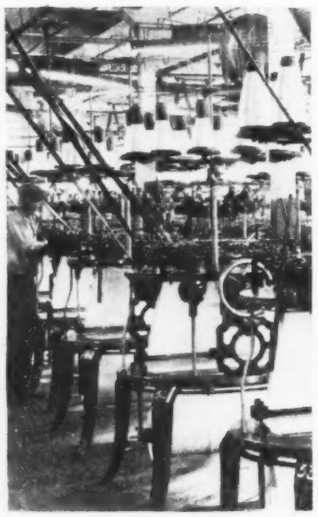
RAYON was first used for underwear fabric by the circular-knitting interests in 1917. The manufacturing of this type of cloth was found to be very difficult, due mainly to unsuitable preparation of the rayon yarn for the knitting machines. The yarn was received at the knitting mill in small skeins. These were waxed or oiled and put on the winding machines, which were poorly constructed in the early days for rayon work. The knots and slubs in the skeins would run through the winding machines and on to small wooden spools, with a capacity of ½ lb. of rayon per spool. A knitter would be able to operate two knitting machines at a time, each machine having two feeds. This work was sufficient to keep him busy all day.

About 1919 a new bottle-shaped bobbin winder was introduced, having a greatly improved knot and slub catcher which prevented many defects from getting on to the bobbins. The capacity of each bobbin was then about 1½ lb. of rayon yarn, and the knitter could operate five machines at a time instead of two.

Further improvements were developed, including knitting machines with eight feeds to a machine; and the use of cones was introduced. At first the cones were troublesome; but thanks to constant research and experimentation the source of the trouble was removed and 1½-lb. cones became entirely satisfactory.

The further development of the cone principle finally produced a 3-lb. Jumbo cone, which enabled knitters to operate more machines. The knitting-machine manufacturers further increased the number of feeds. Next a 4-lb. Jumbo cone was introduced. By using the double tie-on method, a total of 8 lb. from two cones can be employed as a source of supply; and a knitter can operate approximately fifteen machines with ease.

Progress during the last year was mainly one of increased production, and the load on knitting machinery was practically 80% of full capacity. On account of the peak load, a closer check than ever before was made on the knitting machines to maintain production.



Satisfactory performance of a machine is considered to depend on its running continuously for one year without replacement of parts. Adjustments are made only for the requirements of the various types of cloth needed. After one year of continuous operation, in order to eliminate defects, the machine should be stripped down completely and the parts washed in a lye solution of proper strength. This lye bath removes the gummy substance which accummulates from the action of oil and rayon yarn, especially on such parts as the cylinder and cams. Needles, sinkers, pressers, and similar parts are replaced in the cylinder. Old needles, sinkers, and pressers, after washing, are used in machines which have been operating for at least six months. The removal of all foreign substances from the moving parts eliminates needle breakage. When these parts are clogged, the pressers bear against the beards of the needles and prevent their release. The breakage of a needle causes a defect or a hole in the cloth.

Experience has shown that defects such as drop-outs may be largely eliminated as follows: First a very soft cotton pad, about ¼-in. thick, should be used as filler between the cone and the bobbin stand. Where proper pads are not used, the thread has a tendency to slide underneath the cone and break off, causing a press-off. Second, the stop motions controlling the movement of the thread through the needles should be taken apart every six months, cleaned, and the defective parts replaced. In addition the stop motions should be set and adjusted to the denier size of the rayon thread used. Holes are also prevented by having the machine completely adjusted for the size of the thread and stitch used. The machine should be checked for true settings once a week to assure constantly satisfactory performance.

To reduce labor costs, all types of knitting machines should be equipped with the double-cone tie-on method. In this system the end of one cone is tied on to a second lower cone, and when the first cone runs out, the second automatically comes through, eliminating rayon waste and enabling the knitter to operate a greater number of machines. This gives a greater production as compared to the single-cone method.

Rayon Fabrics of Today

NEW PRODUCTS EVIDENCE IMPROVEMENT IN SYNTHETIC FIBERS AND THEIR USE

By Carl C. Mattmann, Jr.
Fabric Technician
Fitchburg Yarn Co. and A. M. Tenney Associates

ALTHOUGH many things have contributed to the evolution of synthetic-fiber fabrics from the crude baronet satins and rayon-trimmed materials of around 1915 to the handsome synthetic-fiber fabrics in all classifications found on the market today, the principal factor has probably been the downward trend in the range of deniers. In 1915 the deniers ran 300, 250, 200, and 150. Not so many years ago they reached 100 and 75. Today 65, 50, and 45 are not uncommon, and yarns as fine as 15-denier are commercially obtainable.

Of course the successful spinning of finer filaments is mainly responsible for the lower deniers, and in fact this trend in filaments has led to a vast improvement in the heavier deniers, which now contain more filaments than formerly, having therefore better draping and covering qualities. Along with these developments has come greater uniformity in the affinity for dyestuffs. Even the blacks frequently lacked uniformity in 1915.

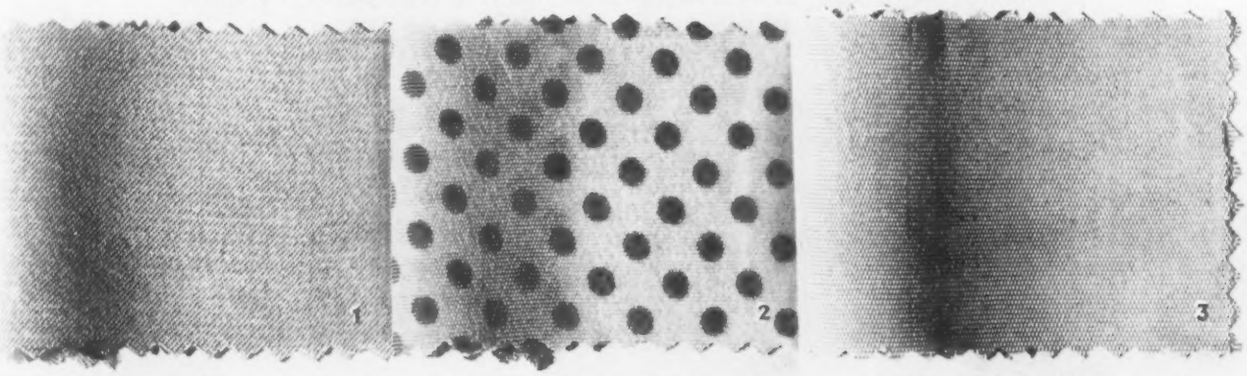
Although the finer deniers have made possible the production of better fabrics, they have increased the problems of the mills using rayon. The yarns, being smaller, are weaker; and denser fabrics must be woven, with the result that the ends are crowded together in the looms and are more subject to chafing. Accurate adjustment of the looms is essential, and they must be run slower. Sizing cannot be too heavy or the ends will become brittle. "Split fibers" are easier to produce, although they can be completely avoided by proper slashing—in fact, it appears probable that slashing is the most important process in the production of rayon fabrics. Lack of uniform tension on the yarns in the operations previous to slashing, once a very serious problem, has been largely overcome by improvements in machinery and methods and by the tendency among synthetic-fiber manufacturers to deliver their yarns on uniformly wound wood spools ready for the warper.

One may ask why fine rayons, which are no finer than the majority of silks, give more trouble to the weaver. The answer is that silk yarn is basically stronger and is usually protected by its natural gum in weaving.

Today fabrics of synthetic-fiber yarns have style. This means that their appearance appeals to stylish individuals and also that the designers are following and meeting style trends. Designers who do not follow styles learn eventually that, in spite of their ability to turn out good constructions, they are wasting time and money. The most successful designers follow garment as well as fabric styles, because the former often govern the latter. In a paper presented by the writer at the spring meeting of the Alumni Association of Philadelphia Textile School, he outlined a desirable procedure for developing new fabrics which meet style trends.

The illustrations and construction details on the next three pages feature certain fabrics of current interest. Three old samples are included below to show the contrast between synthetic-fiber fabrics of today and those of some ten to fifteen years ago. Finished width in constructions numbered 1 to 24 is 39 in.

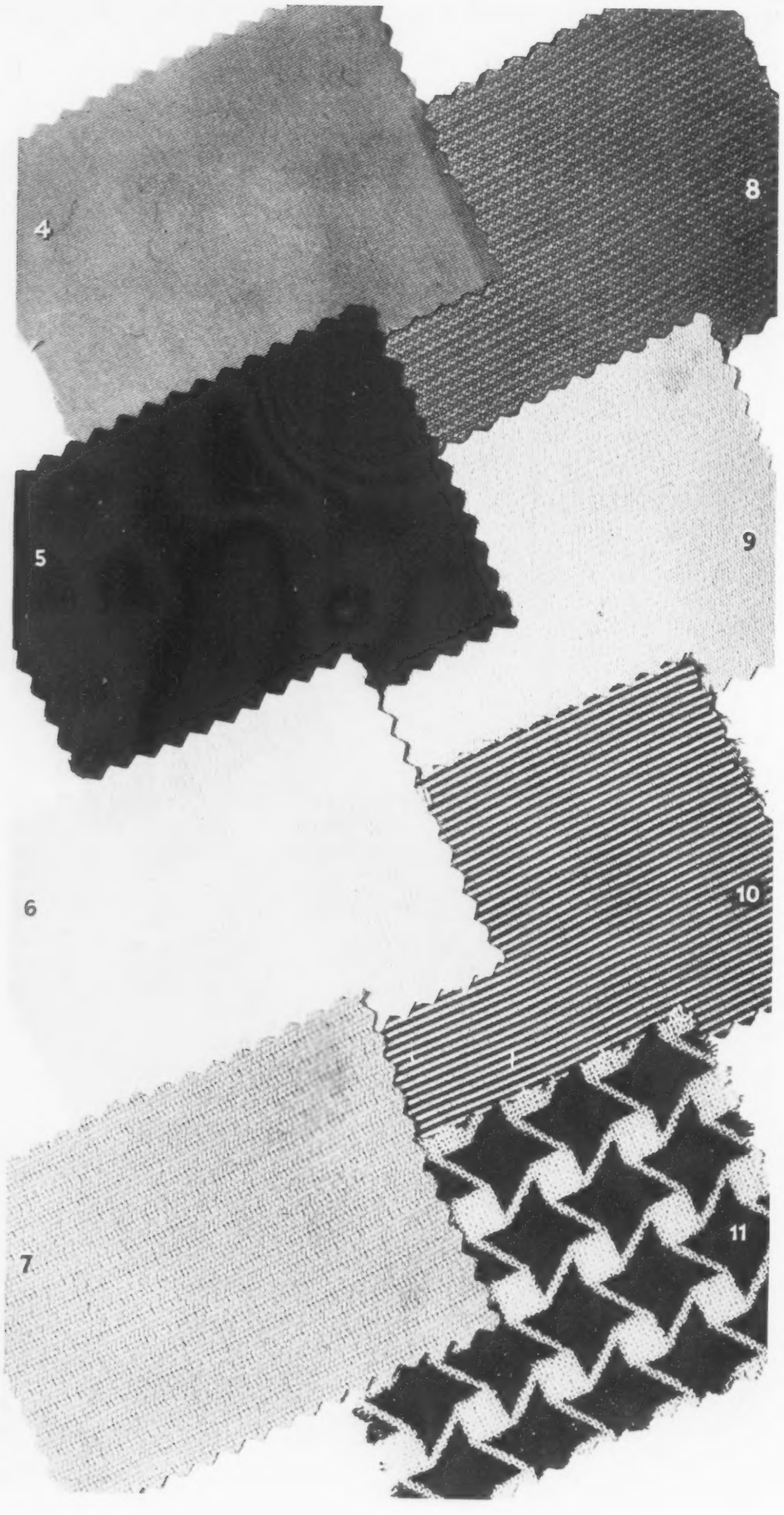
FABRICS OF YESTERDAY—THESE TEN-YEAR-OLD SAMPLES ARE SHOWN FOR COMPARISON WITH THE NEW FABRICS WHICH FOLLOW



1. Crepe Satin. Warp: 44½" in reed, 100/40-den. rayon, 160 ends. Filling: 72 picks 100/40-den. rayon crepe, 2 r. 2 l., (5-shaft.)

2. Crepe. Warp: 44" in reed, 150/24-den. bright rayon, 88 ends, 44/2/1 reed. Filling: 44 picks 150/24-den. rayon crepe, 2 r. 2 l.

3. Taffeta. Warp: 41" in reed, 150/24-den. bright rayon, 88 ends per inch, 44/2/1 reed. Filling: 41 picks 150/24-den. bright rayon.



4. *Taffeta.* Warp: 41" in reed, 75/26-den. bright acetate, 200 ends, 50/4/1 reed. Filling: 64 picks 120/40-den. bright acetate. Weave: plain.

5. *Crepe Satin.* Warp: 47" in reed, 65/20-den. bright acetate, 320 ends, 40/8/1 reed. Filling: 92 picks 100/40-den. rayon crepe, 2 r. 2 l. Weave: 8-shaft satin.

6. *Crepe.* Warp: 47" in reed, 100/34-den. dull acetate, 135 ends, 45/3/1 reed. Filling: 76 picks, 5-thd., 13/15 Japan crepe, 2 r. 2 l. Weave: plain.

7. *Novelty Gros-Rib Crepe.* Warp: 48" in reed, 100/60-den. dull rayon, 120 ends, 40/3/1 reed. Filling: 76 picks 100/40-den. rayon crepe, 2 r. 2 l. Weave:

8. *Heavy Sheer.* Warp: 48" in reed, 100/34-den. voile twist, 22 t., 160 ends, 40/4/1 reed. Filling: 50 picks 2/60s worsted crepe, 2 r. 2 l. Weave:

9. *Faille Type.* Warp: 44" in reed, 2 beams, 100/40-den. voile twist, 22 t., 190 ends, 38/5/1 reed. Filling: 72 picks 100/40-den. rayon crepe, 2 r. 2 l. Weave:

10. *Bengaline Type.* Warp: 46" in reed, 1 end 100/40-den. bright rayon alternating with 1 end 100/34-den. dull acetate, 176 ends, 44/4/1 reed. Filling: 68 picks 61/2 spun rayon crepe, 2 r. 2 l., 2 picks in a shed.

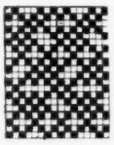
11. *Heavy Sheer.* Warp: 43" in reed, 1 end 5-thd. 13/15 Japan crepe alternating with 1 end spiral yarn consisting of 2 ends of 150-den. rayon, 36 ends, 18/2/1 reed. Filling: 28 picks same yarn as warp. Weave: plain. Note: A variation is sometimes made by means of the sand-crepe weave with a right-turn spiral alternating with a left-turn spiral in the warp and 2 right-turn picks alternating with 2 left-turn picks in the filling.

12. *Bengaline.* Warp: 48" in reed, 2 beams, 1 end 100/40-den. bright rayon alternating with 1 end 100/34-den. dull acetate, 168 ends, 42/4/1 reed. Filling: 48 picks 29/2 spun rayon crepe, 2 r. 2 l., 2 picks in a shed.

13. *Crepe with Double Pin Rib.* Warp: 46" in reed, 100/40-den. dull rayon, 168 ends, 42/4/1 reed. Filling: 60 picks on pick-and-pick loom, as follows:
1 pick 41/2 spun-rayon crepe r. t.

1 pick 41/2 spun-rayon crepe l. t.
1 pick 75/30-den. rayon crepe l. t.
1 pick 75/30-den. rayon crepe r. t.
1 pick 41/2 spun-rayon crepe r. t.
1 pick 41/2 spun-rayon crepe l. t.
1 pick 75/30-den. rayon crepe l. t.
1 pick 75/30-den. rayon crepe r. t.
Weave: plain.

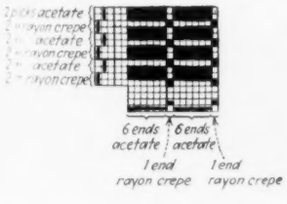
14. *Pin-Rib Bengaline.* Warp: 48" in reed, 75/26-den. dull acetate, 192 ends, 48/4/1 reed. Filling: 52 picks 41/2 spun rayon crepe 2 r. 2 l. Weave: 2 repeats wide, 1 repeat high:



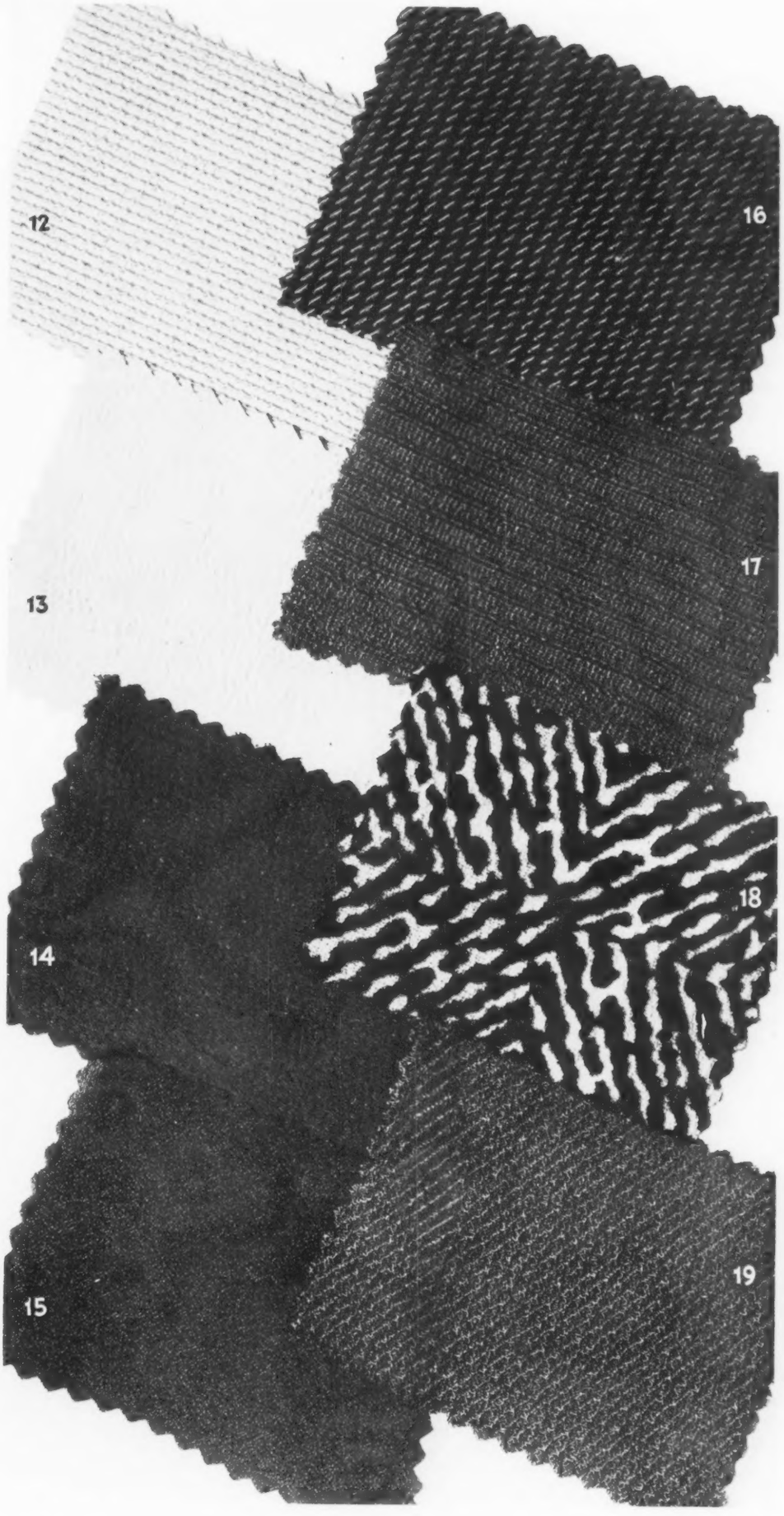
15. *Cross-Dyed Sable.* Warp: 47" in reed, 100-den. cuprammonium crepe, 2 r. 2 l., 120 ends on loom, 40/3/1 reed. Filling: 60 picks on loom, 1 end 65-den. cuprammonium twisted with 1 end 45-den. dull acetate, 45/50 turns, one-way twist. Weave: sand crepe.

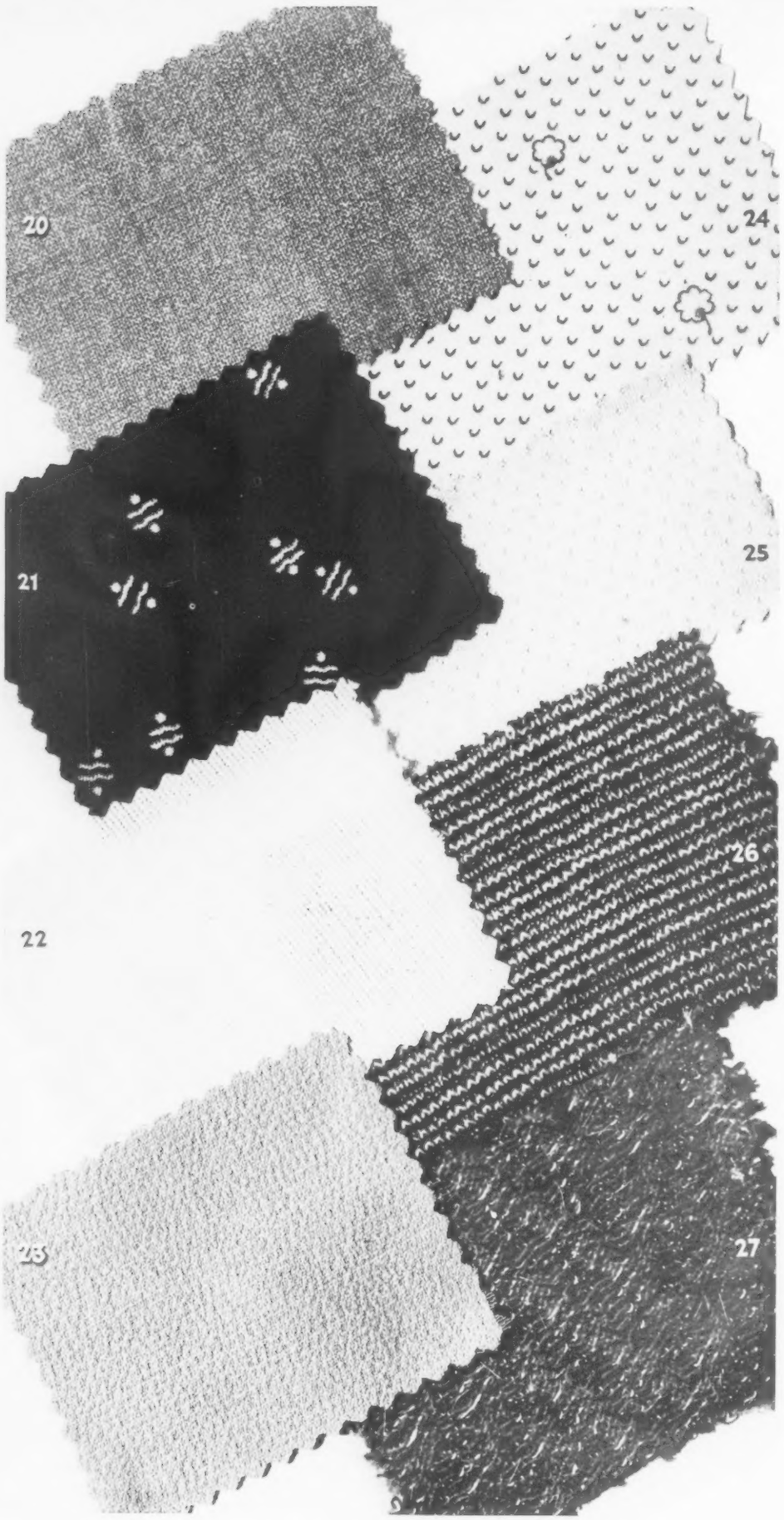
16. *Cross-Dyed Surah.* Warp: 41" in reed, 135 ends on loom, 8 ends of all-cuprammonium spiral consisting of 1 end 65-den. 35/40 l. t. twisted (10 turns left) with 1 end 50-den. 15 r. t, alternating with 8 ends cuprammonium and acetate spiral consisting of 1 end 65-den. 35/40 l. t. cuprammonium twisted (10 turns left) with 1 end 45-den. 15 r.t. dull acetate, 45/3/1 reed. Filling: 108 picks on loom, 150-den. cuprammonium untwisted. Weave: regular 5/5 twill.

17. *Novelty Ribbed Sheer.* Warp: 56" in reed, 2 beams, 1 end r. t. 200/75-den. rayon crepe 6 ends 100/28-den. dull acetate 1 end r. t. 200/75-den. rayon crepe 6 ends 100/28-den. dull acetate, etc. 20 ends per inch of rayon crepe and 120 ends of acetate. 20 reed, 6 ends and 1 end in dent. Filling: 64 picks, 2 picks 170/40-den. dull acetate 2 picks l. t. 100/40-den. rayon crepe 2 picks 170/40-den. dull acetate 2 picks l. t. 100/40-den. rayon crepe, etc. Weave, 2 repeats wide, 1 repeat high:

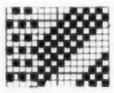


18. *Faille Type.* Warp: 46" in reed, 2 beams, 100/40-den. rayon, 114 ends, 38/3/1 reed. Filling: 44 picks 18/1 spun-rayon crepe, 2 r. 2 l. Weave 2 repeats high, 2 repeats wide:





19. *Sheer Crepe.* Warp: 48" in reed, 75/26-den. voile twist 28 t. acetate, 96 ends, 48/2/1 reed. Filling: 68 picks 75/30-den. rayon crepe, 2 r. 2 l. Weave:



20. *Wool and Spun-Rayon Ondé.* Warp: 45" in reed, 24/2 wool and spun-rayon ondé, 1 end r.t. ondé alternating with 1 end l.t. ondé, 36 ends, 18/2/1 reed. Filling: 28 picks 24/2 wool and spun-rayon ondé, 2 picks r.t. ondé alternating with 2 picks l.t. ondé. Weave: plain.

21. *Spun-Rayon Broadcloth, Printed.* Warp: 42" in reed, 50/3 spun rayon, 72 ends, 36/2/1 reed. Filling: 48 picks 50/3 spun rayon. Weave: plain.

22. *Double Whipcord.* Warp: 44" in reed, 100/34-den. dull acetate, 156 ends, 52/3/1 reed. Filling: 72 picks 60/2 spun silk. Weave:

23. *Clothy, Wooly Crepe.* Warp: 48" in reed, 100/34-den. dull acetate, 135 ends, 45/3/1 reed. Filling: 48 picks 29/2 spun rayon, 2r. 2l.

24. *Spun-Rayon Sheer Type, Printed.* Warp: 42" in reed, 30/1 spun rayon, 60 ends, 30/2/1 reed. Filling: 60 picks 30/1 spun rayon. Weave: plain.

Note: Finished widths of above fabrics in all cases, 39".

25. *Pebble-Stitch Underwear.* Fine knitted material manufactured by Allen-A Co., Kenosha, Wis., for men's shirts, shorts, and union suits.

26. *Rayon and Wool Knitted Outerwear.* White rayon is used to brighten up this fabric.

27. *Knitted Novelty.* Again rayon is used to brighten the darker stripe in a wool outerwear material from Lombardi-Ullmann Corp. Fabric also contains rabbit hair.

ADVERTISING PAGES REMOVED

Status of Textile Codes . . .

MOST BRANCHES MADE RAPID PROGRESS TOWARD COMPLETION

CODE manufacture continues to be the major occupation in the textile industry. Practically every branch imaginable—not to mention some which few had imagined previously—has produced or is producing a magnus opus.

The table on the two pages immediately following summarizes the codes under which the various branches are now operating. It should be emphasized that only those codes, or sections of codes, which have been approved by NRA are included. Consequently, the table is subjected to further revision, as complete codes are approved and substituted for temporary executive orders. In several cases, the final provisions will differ radically from those tentatively in effect.

On the following pages, the outstanding developments in the several branches of the industry up to Sept. 5 are indicated.

CARPETS AND RUGS

Pending a hearing on the code submitted to NRA by the Institute of Carpet Manufacturers of America, it became operative in the industry at the time of the recent fall openings through unanimous and voluntary agreement among the members of the institute representing approximately 90% of the production capacity. Representatives of allied manufacturing, wholesale, and retail distribution have been in consultation with Herbert L. Gutterson, president of the institute, in reference to the code, and divergent points of view have been given consideration. Code as submitted, proposed 40-hr. week with minimum wage of $14 per week; also called for a method of production control.

CORDAGE AND TWINE

In compliance with request from the Cordage Institute, the President placed the cordage and twine industry under the labor provisions of the cotton textile code pending consideration and approval of the industry's own code. The proposal from the institute was signed by Ellis W. Brewster, J. S. McDaniel and Raymond A. Walsh.

COTTON

In connection with the cotton textile code which, as finally approved by the President, enjoys the national distinction of being Code No. 1, General Johnson has announced the appointments of Dr. Robert W. Bruere as chairman, and B. E. Geer and George L. Berry as members, of the Cotton Textile National Industrial Board. The purpose and scope of this board were outlined in the last issue of TEXTILE WORLD. These three men constituted the so-called "stretch-out" investigating committee named during the hearings on the code. In the order named, they represent NRA, industry, and labor, respectively.

COTTON BATTING

On request of the National Association of Dry Goods Cotton Batting Manufacturers, this industry was granted a modified PRA. In the place of similar clauses in the blanket code, there were substituted provisions defining the industry and setting a maximum of an average of 40 hours per week per employee, until Jan. 1, and thereafter during each six-month period, and not more than 48 hours in any one week nor more than eight hours in any one day.

FELT

Representatives of the hair and jute felt industry were granted a modified PRA, the substituted clauses calling for a maximum of 40 hours per week per employee, averaged over an eight-week period, provided that no employee should work more than 48 hours in any one week nor more than eight hours in any one day; and also calling for a minimum wage of 35c. per hour, regardless of whether the employee is compensated on the basis of a time rate or a piece-work performance. Wool felt industry also granted modified PRA: 40-hr. week, minimum wage 35c. per hr.

HOSIERY

Hearing on the code submitted by the National Association of Hosiery Manufacturers was held in Washington Aug. 10. Deputy Administrator Lindsay Rogers presided. The code was presented and interpreted by Earl Constantine, managing director of the association. Assisting the deputy administrator were Dr. George W. Taylor, as industrial adviser; Sidney Hillman, as labor adviser; Dr. C. C. Balderston, as consumer adviser; and E. Gross, as legal adviser.

Following the hearing, revisions were made and the code re-submitted to NRA. Among the proposed revisions was the elimination of the clause providing for election of representatives of the employees, by secret ballot, to confer with the management on matters involving controversy. This clause was eliminated at the request of union representatives. In acceding to this request, according to the association's organ, the manufacturers said they were willing to do so providing "the official record would clearly show that the responsibility for the failure to provide in the code a means for disposing of disputes rests squarely on the shoulders of labor."

The provision in the code calling for a Board of Control evoked heated discussion at the hearing. Mr. Hillman objected on the ground that labor was not represented on this board. It was explained by representatives of NRA that, since the cotton code was approved, the administration has

Recovery Act Features in This Issue

	Page
Editorial	53
Status of Textile Codes	79
Textile Codes at a Glance	80
Hosiery Code as Approved	82
Rayon Weaving Code as Approved	83
Effect of Codes	84
Details of Progress under NRA in Branches of Textile Industry, in Digest Sections Beginning	108

been moving in the direction of evolving a standard administrative body, or code authority, including representatives of industry, labor and government. Such an authority will replace the proposed Board of Control.

Code as revised was approved by President and became effective Sept. 4.

KNITTING MACHINERY

The hearing on the code for the knitting machine industry and the braiding and wire-covering industry, held in Washington Aug. 10, was concluded in the record time of 23 minutes. Deputy Administrator Malcolm Muir presided. The code was presented by Walter L. Toy, vice-president of Scott & Williams, Inc., who spoke for the joint committee of the two associations representing these industries. Harry Swinglehurst, president of Scott & Williams, Inc., acted as industry adviser to NRA.

The code as submitted calls for a maximum work-week of 40 hours per employee, and a maximum of two 40-hour shifts for productive equipment. The minimum wage originally proposed was 35c. per hour but the agreement reached in the conference which preceded the hearing provides for 40c. an hour.

LACE

The President approved, Aug. 14, the code for the lace industry submitted by the American Lace Manufacturers Association. The code became effective Aug. 28. It fixes a minimum wage of $13 for a 40-hour week, and limits machine operations to two 40-hour shifts a week. It was approved by the President under a condition requiring the creation of a planning and fair practice agency for the industry—three members to be named by General Johnson and five by the industry itself.

The Textile Codes At a G

	Cotton	*Wool*	*Rayon Weaving*	*Rayon Yarn*	*Silk*	*Throwing*
Maximum Hours per Worker	40 hrs. per week. (Except repair crews, engineers, electricians, firemen, supervisory staff; shipping, watching and outside crews; cleaners.)	40 hrs. per week. (Except repair crews, engineers, electricians, firemen; office, sales and supervisory staff; shipping, watching and outside crews.)	40 hrs. per week. (Exceptions as in cotton code.)	40 hrs. per week—based on 4 weeks average. (Maintenance and repair crews may have extension in an emergency.)	40 hrs. per week. (Exceptions as in cotton code.)	40 hrs. per week. (Exception as in cotton code.)
Maximum Hours per Machine	Two 40-hr. shifts per week for spinning spindles and looms. (Tire yarn and fabric production temporarily excepted.)	Two 40-hr. shifts on combs, spinning spindles, looms, and knitting machines. (Woolen spindles and worsted combs temporarily excepted.)	Two 40-hr. shifts for looms.	No limitation; continuous operation permitted.	Two 40-hr. shifts for productive equipment.	Two 40-hr. shifts for productive equipment.
Minimum Wages	$12 per 40-hr. week in South; $13 in North. (Except learners during 6-weeks apprenticeship.)	$13 per 40-hr. week in South; $14 in North.	$12 per 40-hr. week in South; $13 in North. (Exception as in cotton code.)	$13 per 40-hr. week. (Employees may not receive less for 40 hrs. than for 48-hr. week as of May 1.)	$12 per 40-hr. week in South; $13 in North. (Exceptions as in cotton code.)	$12 per 40-hr. week in South; $13 in North. (Exception as in cotton code.)
Installation of Equipment	Code authority may require certification of installation of additional productive machinery, other than for replacement or to bring plant in balance.	No provision.	Same as in cotton code.	No provision.	See below (under "Status")	See below (under "Status")
Fair Trade Practices	Code authority may set up requirements as to methods of trading, naming and reporting of prices—to prevent unfair competitive prices and practices.	Provision made for supplementary clauses to be submitted from time to time to NRA.	Same as in cotton code.	No provisions as yet.	See below (under "Status")	See below (under "Status")
"Stretch-out"	Status quo, as of July 1, 1933, maintained.	Status quo, as of July 1, 1933, maintained.	Same as in cotton code.	No provision.	See below (under "Status")	See below (under "Status")
Organization Submitting Code	Cotton Textile Industry Committee, 320 Broadway, New York.	National Association of Wool Manufacturers, 229 4th Ave., New York.	National Rayon Weavers Association, 40 Worth St., New York.	Rayon and Synthetic Yarn Industry Committee, 2 Park Ave., New York.	Silk Association of America, 468 4th Ave., New York.	Throwsters Research Institute, 468 4th Ave., New York.
Status	Approved by President and became effective July 17.	Approved by President and became effective Aug. 14.	Approved by President Aug. 25 by modifying and amending cotton textile code.	Approved by President and became effective Sept. 9.	Placed under labor provisions of cotton textile code, effective July 17, pending approval of its own code.	Placed under labor provisions of cotton textile code, effective July 17, pending approval of its own code.

LINEN

A code for the linen industry, submitted by the Linen Association, proposes maximum working hours of 40 hours per week, with exception of a six-week period of overtime during which a maximum of 44 hours per week shall prevail at one-and-one-third pay for overtime, with the understanding that the maximum hours per week for the year's average shall not exceed 40. The minimum wage proposed for factory or mechanical workers, or artisans, is $13—and for accounting, clerical, office, service, or sales employees (excepting outside salesmen), $15 per week.

OUTERWEAR

The knitted outerwear industry was authorized by NRA to operate under a modified PRA. The clauses substituted for similar provisions in the blanket code call for a maximum 40-hour week for employees; a minimum wage of 35c. per hour or $14 per 40-hr. week; and a maximum of two 40-hr. shifts for knitting and winding machinery, or—as an alternative—a straight single 40-hr. shift for both labor and machinery with a leeway of a maximum of eight hours of overtime weekly, provided that an average of not more than 40 hours per week be maintained. The only change made by the administration in the labor provisions as originally proposed by the industry was the increase of the minimum wage from $13 to $14. The tentative code was submitted by the National Knitted Outerwear Association. The industry has been operating under the modified PRA.

PROCESSING

As noted previously, the textile finishing industry, as represented by the National Association of Finishers of Textile

at a Glance

[Only those codes either finally approved or put into effect tentatively by executive order, *up to Sept. 5*, are summarized]

Hosiery	*Underwear*	*Outerwear*	*Lace*	*Finishing*	*Silk and Rayon Dyeing and Printing*	*Cordage and Twine*
40 hrs. per week. (Except supervisors, foremen, engineers, electricians, repair men, dyers, shipping crews, watchmen, cleaners, outside crews.)	40 hrs. per week. (Exceptions as in cotton code.)	40 hrs. per week. (Except repair crews, engineers, electricians, firemen, supervisory staff, shipping, watching and outside crews, and cleaners.)	40 hrs. per week. (Except repair crews, salesmen, supervisory staff. Also except engineers, electricians, firemen, designers, draftsmen and shipping crews, but time-and-one-half for overtime.)	40 hrs. per week. (Exceptions as in cotton code.)	40 hrs. per week. (Except, to prevent damage in continuous processes, may work 2 hrs. extra per day, but not over 48 hrs. in any one week.)	40 hrs. per week. (Exceptions as in cotton code.)
Two 40-hr. shifts. (Woolen hosiery mills may operate knitting machines 3 shifts until Dec. 31. One-shift full-fashioned footing equipment to continue single shift during first 6 mos.; double-shift footers to work two 35-hr. shifts.	Two 40-hr. shifts for productive equipment.	Two 40-hr. shifts for knitting and winding; one 40-hr. shift for other productive equipment. May operate all equipment one 40-hr. shift, with overtime not to exceed 8 hrs. one week, to average 40 hrs. per week in 4 mos.)	Two 40-hr. shifts for productive machinery.	Two 40-hr. shifts for productive equipment.	80 hrs. per week for productive machinery and 96 hrs. for a plant. (Except for activities of firemen, supervisors, office staff, representatives, repair shop, transportation crews and watchmen.)	Two 40-hr. shifts for productive equipment.
Sliding scale, with lowest minimum $12 per 40-hr. week in South and $13 in North. (Except learners, for 2 months, minimum 8c; and sub-standard workers.)	$12 per 40-hr. week in South; $13 in North. (Exception as in cotton code.)	$14 per 40-hr. week. (Except learners, during 8-weeks apprenticeship.)	$13 per 40-hr. week. (Except learners, who shall be paid not less than 80% of minimum.)	$13 per 40-hr. week in South; $14 in North. (Exception as in cotton code.)	$18 per 40-hr. week for males; $14 for females. (Except employees from 16 to 18 yrs. whose minimum is set at 80% of above.)	$12 per 40-hr. week in South; $13 in North. (Exception as in cotton code.)
Code authority may require certification of installation of additional productive equipment, except for replacement or to bring plant in balance.	See below (under "Status")	See below (under "Status")	Code authority may require certification of installation of additional productive machinery, except for replacement or maintenance of existing equipment.	See below (under "Status")	Prohibits installation of additional productive machinery (except for replacement, repair and improvement) unless authorized by code authority.	See below (under "Status")
Detailed trade practice provisions include prohibition of selling below cost; specifications to prevent misbranding; etc., etc.	See below (under "Status")	See below (under "Status")	Code authority may set up requirements as to methods of trading, naming and reporting prices, etc.—to prevent unfair competitive prices and practices.	See below (under "Status")	Prohibits selling below cost and sets up detailed requirements for fair trade practices.	See below (under "Status")
Status quo, as of July 15, 1933, maintained.	See below (under "Status")	See below (under "Status")	No provision.	See below (under "Status")	No provision.	See below (under "Status")
National Assn. of Hosiery Mfrs., 468 4th Ave., New York.	Underwear Institute, Union Trust Bldg., Washington, D. C.	National Knitted Outerwear Assn., 1 Madison Ave., New York.	American Lace Mfrs. Assn., 106 West 38th St., New York.	National Assn. of Finishers of Textile Fabrics, 40 Worth St., New York.	Institute of Dyers & Printers, Paterson, N. J.	Cordage Institute, 60 E. 42nd St., New York.
Approved by President and became effective Sept. 1.	Placed under labor provisions of cotton textile code, effective July 24, pending approval of its own code.	Labor provisions, only, put into effect Aug. 1 as modified P.R.A. pending approval of code as a whole.	Approved by President and became effective Aug. 28.	Placed under labor provisions of cotton textile code (with different minimum wages) effective July 31, pending approval of its own code.	Code put into effect temporarily by executive order, beginning July 23, pending hearing and further revision.	Placed under labor provisions of cotton code, effective July 27, pending approval of its own code.

Fabrics, has been operating under the cotton textile code (except for an advance of $1 in the minimum wages) by executive order pending submission and approval of the industry's own code. The code of the silk and rayon dyeing and printing industry, as represented by the Institute of Dyers and Printers, has been in effect temporarily pending final approval. The National Textile Processors Guild submitted code proposing $13 minimum for 40-hour week. The National Rayon Yarn Processors Association, newly organized, has joined with the Guild so far as the processing functions are concerned but will continue to act in connection with the merchandising aspects of its industry.

RAYON

As noted in last month's issue, the labor provisions of the two codes submitted by the National Rayon Weavers Association and by the committee representing the rayon and synthetic yarn-producing industry, have been in effect by executive order pending final approval of the codes. Finally, the weavers' code was approved by President Roosevelt on Aug. 25, and the yarn code on Aug. 27. A separate code was filed by makers of acetate yarn.

SILK

Difference of opinion within the industry delayed agreement on the code of the Silk Association of America. As finally submitted, the code proposed minimum wages of $12 per week in the South and $13 in the North; maximum work-week of 40 hours per employee, and maximum of two 40-hr. shifts for productive machinery. Pending approval of its code, hearing on which was scheduled for Sept. 12, the industry continued to operate under the cotton-textile code, by executive order, as noted previously in these columns.

TEXTILE MACHINERY

Hearing on the code for the textile machinery manufacturing industry was held in Washington Aug. 25. Deputy Administrator Malcolm Muir presided

The code, as submitted, proposed minimum wages of $14 per week for accounting, clerical, office, and service employees; and 35c. per hour to other employees with certain exceptions and provisos. The maximum work-week was proposed at 40 hours for employees, with a flexible provision that during peak periods an employee might work up to 48 hours per week in not more than eight weeks of any six-months' period.

The code was submitted to NRA by B. H. Bristow Draper, of Draper Corp., and D. F. Edwards, of Saco-Lowell Shops, acting as a sub-committee of the board of directors of the National Association of Textile Machinery Manufacturers.

THROWING

Hearing on the code for the throwing industry, submitted by the Throwsters Research Institute, was held in Washington Aug. 29. A. D. Whiteside, Deputy Administrator, presided. The code, as submitted, proposed a 40-hr. maximum work-week with minimum wages of 32½c. an hour in the North and 30c. in the South—thus corresponding to the weekly rates of $13 and $12, respectively, in the cotton textile code. The proposed code limited hours of machinery operation to two 40-hr. shifts per week. Provision was made for a reduced force of male operatives, not to exceed 35% of the total number of employees on regular shifts, who may be employed "when and as necessary during the time neither of the full shifts is working" and whose minimum wage would be 33⅓% above minimum rate of the regular shifts.

UNDERWEAR

As a result of the hearing held at Washington Aug. 10-11 on the code submitted by the Underwear Institute, revisions were made in it through conferences between NRA and the institute's officials. The code was presented and interpreted at the hearing by Edward J. McMillan and Roy A. Cheney, president and secretary, respectively, of the institute. Deputy Administrator A. D. Whiteside presided.

Arthur D. Whiteside, deputy administrator of NRA, at his desk in Washington. Over this desk have come many of the textile codes. Mr. Whiteside presided over the wool-textile code hearing on July 24 and 25, the underwear code hearing on Aug. 10, the silk industry hearing on Sept. 12, and others. Photo by Underwood & Underwood.

One of the main points at issue was the extent to which the code should include allied branches—and among the revisions was a re-shaping of the "definitions" clauses.

The revised code proposed a work-week of 40 hours for employees; a maximum of one 40-hour shift for sewing machines and two 40-hour shifts for knitting machines; and minimum weekly wages of $12 in South and $13 in North.

Pending approval of its own code, the industry continued to operate under the labor provisions of the cotton textile code, by executive order, as noted previously in these columns.

UPHOLSTERY AND DRAPERY

A hearing was held, Aug. 30, on the code for the upholstery and drapery textile industry. The code, as submitted, proposed a 40-hour week for employees; two 40-hr. shifts for looms; minimum wages of $14.00 and $15.40, South and North respectively. Sharp conflict developed between the National Upholstery & Drapery Association and the Cotton Textile Industry Committee over the question of the development of a separate code for this industry. George A. Sloan, speaking for the cotton group, argued that classification should be by fibers, not by market usage. The sponsors of the code contended that it would be unfair to workers on upholstery and drapery fabrics to put them under the cotton code.

WOOL

In connection with the wool textile code which was approved by the President and became effective Aug. 14, as noted in last month's issue, General Johnson stayed the application of the machinery-limitation provisions of the code so far as woolen spinning spindles and worsted combs are concerned, pending determination of the application for exemption received from the carded woolen manufacturers and the commission combers. The temporary stay was based on the apparent probability of a temporary scarcity and disruption of the supply of woolen yarns and worsted tops, if the provision became effective.

Hosiery Code Approved

THE important details of the hosiery code, which was approved by the President and became effective Sept. 4, are abstracted below:

Hours of Work: 40 hours per week for employees in productive operations except supervisors, foremen, engineers, firemen, electricians, repair-shop men, dyers, shipping force, watchmen, cleaners, outside workers, sales force, and those engaged in emergency maintenance or repair work. (A schedule of hours and wages for these excepted classes to be submitted by Jan. 1, 1934.) Office employees not to exceed average of 40 hours per week over each six months period.

Plants to operate at maximum of two shifts of 40 hours each

per week, with the following provisos: For first six months of code operation, full-fashioned hosiery plants whose footing equipment on July 24, 1933, operated on two-shift basis, may continue two shift but length of each shift not to exceed 35 hours per week, and rates to be paid to knitters, knitting-helpers, and toppers on these 35-hour shifts shall provide earnings equal to those they would receive on 40-hour shifts. Full-fashioned hosiery mills whose footing equipment on July 24, 1933, operated one shift shall not, for first six months, operate more than one 40-hour shift. Permanent policy on footer operation to be developed during that period. Woolen hosiery manufacturers may operate knitting equipment not to exceed three 40-hour shifts until Dec. 31, 1933, after which maximum is two 40-hour shifts. (Applies only to manufacturer of hosiery containing at least 20% wool.)

Wages: Minimum wages, for 40-hour week, to be paid at the following rates:

1. *Full Fashioned Manufacture*

Classification of Workers	Minimum weekly rate North	Minimum weekly rate South
Class 1—Leggers, Footers....		
36 gage and below	$18.50	$16.75
39 gage	20.00	18.00
42 gage	21.50	19.50
45 gage	23.50	21.25
48 gage	25.50	23.00
51 gage and above	27.50	24.75
Class 2—Boarders	17.00	15.50
Class 3 — Toppers, Loopers, Seamers, Skein Winders, Menders, Pairers, Finished Inspectors, Helpers on Knitting (over 6 months training) Pairerfolders	15.00	13.50
Class 4—Stampers, Boxers, Gray Examiners, Folders, Cone-winders, Other productive workers, Learners (including machine helpers) for the second 3 months of their training	13.00	12.00
Class 5 — Learners (including machine helpers) for the first 3 months of their training	8.00	8.00

2. *Seamless Manufacture*

Class 1—Machine Fixers	$18.00	$16.25
Class 2—Knitters (above 240 needle) Loopers (above 240 needle) Boarders	14.00	12.75
Class 3—Knitters (240 needle and below), Loopers (240 needle and below), Seamers, Toppers, Menders, Pairers, Welters, Trimmers, Stampers, Folders, Boxers, Inspectors, Winders, Knitters (ribbed top), Shipping Help, Machine Fixer Helpers, other Productive Workers	13.00	12.00
Class 4—Learners (first 3 months training)	8.00	8.00

Amount of production of work required of any employee shall not be increased over that required for same class of work prior to July 15, 1933.

Minimum wages of sub-standard employees to be not more than 20% below those of regular employees in same class of work, total number of sub-standard employees not to exceed 5% of all productive employees of the plant.

Minimum wages for all employees not specified above—except cleaners, outside workers and sub-standard workers—to be at rate of $12 per week in South and $13 in North for 40 hours.

Conditions of Work: Home work prohibited, except where worker can only work at home and requires it as means of livelihood. No minor under 16 years to be employed.

All full-fashioned footing machines to be operated on single-machine basis, i.e., one knitter, or one knitter and one knitting-helper, to one machine. Under no condition is knitter to operate more than two full-fashioned legging machines; when operating two such legging machines, he shall be assisted by two knitting-helpers. Pending recommendations on matter of double-machine full-fashioned legging operations, such machines operating on single-machine basis, shall continue so.

Fair Trade Practices: The following provisions are made part of the code and binding on all hosiery manufacturers:

Association is to develop uniform conditions of sale.

Price guarantees against decline represent unfair trade practice.

To allow commissions, bonuses, rebates, refunds, credits, unearned discounts or subsidees of any kind, to a purchaser, when not extended to all purchasers under like terms and conditions, is an unfair practice.

Manufacturers selling under own brands may enter arrangements for cooperative advertising, manufacturer's share not to exceed 50% of amount actually spent.

Selling merchandise below cost is unfair trade practice except that close-outs of discontinued styles and/or sizes and/or broken assortments may be sold below cost but shall be stamped "Discontinued" on each hose with indelible transfer ordered only through the association. Billing of customer's sample requirements at less than regular stock prices is unfair trade practice. Manufacturers shall determine costs in manner approved by code authority.

To ship hosiery on consignment or memorandum is unfair trade practice, as are also giving of bribes; allowing customer to return merchandise for re-finishing or re-dyeing, without charging actual cost therefore; sale of irregulars in packing of first with intent or effect of deceiving purchaser.

Other unfair trade practices specified include: selling "mill runs" with intent or effect of deceiving consumer; shipping or delivering hosiery which does not conform in quality and value to samples submitted or representations made prior to securing the order, without knowledge or consent of purchaser; selling hosiery marked or branded falsely; imitation of trade marks, trade names, slogans or other marks of identification of competitors. In connection with misrepresentation of materials, it is specified that, if any definite section or sections of the hose be made of material entirely different from that of the bulk or body of the stocking, when such material gives appearance of silk, hose must be stamped with names of both materials. In addition, no material or content shall be stamped on any hose unless it represents at least 5% of hose by weight; when two or more contents exist, if any content is stamped on hose, all contents constituting 5% or more of weight of hose shall be stamped and in the order of major content.

Coordination and Administration: A Hosiery Code Authority is set up to be constituted of eight representatives of employers, two representatives of labor, and two members appointed by NRA. Association shall provide for selection in each major branch of the industry of an advisory committee which shall make recommendations to the code authority. It shall be the duty of the code authority to:

Review all questions or disputes arising under the code; report to NRA all violations or infractions; investigate importation of competitive articles into U. S. on such terms or under such conditions as to render ineffective or seriously endanger the maintenance of this code, and act as agency for making complaint to the President in this matter.

Code authority shall also submit to NRA recommendations: (1) For changes in provisions of code which relate to hours of work, minimum wages, etc.; (2) For changes and additions which relate to fair trade practices; (3) for requirement of registration, by persons engaged in the industry, of their productive equipment and the requirement by the Administrator that prior to installation of additional productive equipment (except for replacement of existing equipment of equal capacity or to establish balance in existing equipment) persons shall secure certificates that such installation will be in accord with objectives of the Act; (4) for acquisition and disposal of surplus used equipment, or scrapping of fully depreciated obsolete equipment, as aid to maintaining proper balance between productive capacity and expectable demand; (5) for requirement by NRA of uniform methods of cost accounting to assure against unfair competition and demoralization of the market through selling below cost.

•

Rayon Weaving Code Approved

THE President approved, on Aug. 25, the code for the rayon weaving industry by putting into force the following modifications and amendments of the cotton textile codes:

(a) That in the definition of the term "Cotton Textile Industry" in Section I of said code, there is inserted after the word "process" the following: "and/or manufacture of woven rayon fabrics, 18 in. or more in width, the warp of which is primarily rayon or other synthetic fiber yarn, whether finished or unfinished" so that the completed sentence shall read as follows: "The term 'Cotton Textile Industry' as used herein is defined to mean the manufacture of cotton yarns and/or cotton woven fabrics, whether as a final process or as a part of a larger or further process, and/or manufacture of woven rayon fabrics, 18 in. or more in width. The warp of which is primarily rayon or other synthetic fiber yarn, whether finished or unfinished."

(b) That in the first sentence of Section VI of said code the word "and" be omitted before the words "the National Association of Cotton Manufacturers" and that there be inserted after these words "and the National Rayon Weavers Association," so that the completed sentence shall read as follows: "To further effectuate the policies of the Act, the Cotton Textile Industry Committee, the applicant herein, or such successor committee or committees as may hereafter be constituted by the action of the Cotton-Textile Institute, the American Cotton Manufacturers Association, the National Association of Cotton Manufacturers, and the National Rayon Weavers Association, is set up to cooperate with the Administrator as a Planning and Fair Practice Agency for the Cotton Textile Industry."

(c) That a new section to be known as Section XVIII be added to the code as follows: "Any manufacturer operating silk looms known to the trade as a silk manufacturer and so listed in trade directories may elect not be bound by any of the provisions of this code with respect to its synthetic fiber production as herein defined above, provided, that notice of such decision by such manufacturer shall be filed in writing with the Cotton-Textile Institute, Inc., at its office at 320 Broadway, New York, N. Y., not later than 6:00 p.m. eastern standard time, on the tenth day following the approval of this paragraph."

Effect of Codes

CANNOT YET BE GAUGED ACCURATELY

HOW are the codes operating in your field? This has become almost the standard form of salutation from our friends who know that the textile industry was the first under the wire. Unfortunately, we can't answer them—and we know of no one who can.

In fact, it is even a little more difficult to give an intelligent answer this month than it was last. The textile situation reflects a hodge-podge of the effects of codes, processing taxes, over-anticipation of the future, delayed seasonal slump and a few other conflicting trends. Nothing short of a feat of alchemy could extract the code-effect from this mess.

Those outside the textile industry who naturally expected to find increased employment resulting from NIRA were shocked to hear of some cotton mills closing down for a period and others reducing the number of machines in operation. They had not taken into account the high rate of anticipatory production and first-hand sales which started in May; or the fear of consumer-resistance to the boosting of prices via processing taxes, which followed in the wake of the spurt. Furthermore, they overlooked the fact that other basic industries lagged behind textiles in the adoption of codes, and that this industry cannot get along by selling to itself.

All of which leads to the statement that the real test of NIRA in textiles is still ahead. We hazard the guess that it will be well into the fall before anything like accurate statements can be made. Meanwhile, all one can do is to express opinions.

Reports of violations of the codes by cotton mills and others continue to be heard. The charge that, in some cases, old employees are classified as apprentices for the period permitted in the codes is one bone of contention. Naturally, there have also been charges that wages have not always been raised in accordance with the terms of the code. Honest manufacturers—and that means the great majority—are sincerely anxious that violations, after sufficient warning is given, should be aired publicly and prosecuted, if definite proof of deliberate intent can be established. It is felt that two or three examples would bring other violators to see the light. Nevertheless, it is urged that extreme precautions be taken to investigate each case thoroughly before public charges are made; too often in such matters injustice is done which cannot be corrected later.

In all this, the function of the national industrial relations boards, with the cooperation of properly constituted state boards, is expected to be a vital factor in maintaining industrial peace.

Last month we wrote principally about the cotton code. Since then, the wool code has become effective. The net conclusion of our contacts with wool manufacturers is that the inaugural event went off satisfactorily; that labor, on the whole, was pleased; and that manufacturers are praying for consumer response which will make the whole thing work.

Some employees were more pleased than others were. In certain sections, an additional wage increase was given over and above that necessitated by the code. To cite a mill typical of this group, the hourly rates were advanced 20% to offset the change from 48 to 40 hours and on top of this was given an additional 10% actual increase in wages.

Here are a few opinions from wool manufacturers whose anonymity, as prophets, we shall protect:

✦ "Our customers have accepted the increases on merchandise so far delivered under the code in accordance with the general agreement. The real test, however, will come later when the buying public will be faced with higher prices, and upon their decision whether to buy or not will depend the success of the whole movement. So far the retailers have put up their prices little, if any. When the effect of the full prices due to the NIRA operation is actually working the test will come. Until that test is made and we know the answer, I do not think anyone can tell anything about the actual final working out under the NIRA.

✦ "I hesitate to make any expression with regard to the effect of the Wool Textile Code to date. The thing is too new and its various advantages and disadvantages too close to the point of observation to make an intelligent appraisal. Likewise we should all be careful for the moment, in order that the matter be not prejudiced, to withhold such criticism of the disadvantages as might otherwise be in order. Of course much depends on intelligent and proper administration. Needless to say, employees are pleased with the short day and the higher wages, and the increases in payroll have been substantial; more so in those establishments that are attempting to further the code to a successful issue than in those which are as usual attempting to see how cheaply they can get off."

✦ "As to employment, there is probably not a great increase because during June and May, mills were operated to such a great extent that the number employed was higher than for ever so long. Wages are certainly somewhat increased, but due to the fact we are compelled to pay for 40 hours what was previously paid for 48 or 50 or whatever the length of work-week was, and because numerous mills have given an additional increment, the cost of labor has gone up sharply in comparison with what it was three months ago. Due to increased cost of production and the impracticability of having a trade practice code in effect yet, there is an uncomfortable uncertainty in the goods market. Despite all this I am immensely pleased with the attitude of the mill owners and how they are trying to live up literally to the requirements of the code."

✦ "The code has not yet been in operation long enough to make any predictions, except to make one statement, and that is that the success or failure will be squarely on the doorstep of the industry itself. The code presents the opportunity for the industry to help itself, and there is no one to pass the buck to, because it is within the rights of the industry now to govern itself, if it is capable of doing so. There is police power to enforce its government, if it desires to be honest. I think the industry is approaching the entire question constructively. There are, of course, the usual human equations, but I think they will be ironed out. There are the human desires to duck. I think probably they will be shown up to the point that it will not be so good to try and get away with it, but I repeat that the code will be just as good as the industry makes it."

Processing Tax . . .

IS IT THE STRAW WHICH BREAKS THE CAMEL'S BACK?

By Paul Wooton
Washington Correspondent, TEXTILE WORLD

AS THIS is written (Aug. 30) officials of the Agricultural Adjustment Administration have not examined the figures on which various cotton mill operators base their contention that the processing tax is proving to be the straw which breaks the camel's back. Likewise they have not had an opportunity to analyze the figures on which these operators claim much larger increases in costs than their statisticians have developed. If errors have been made in their own calculations, they state that they will be glad to have them pointed out. At the same time, they feel confident that they will be able to show that the processing tax cannot be held responsible for increases in prices of 40% or more.

Before these matters can be settled a hearing will have been held and all of the basic facts and figures made a matter of record, from which it is hoped to develop an accurate formula for determining the increase in price which may be charged to the processing tax. Officials of the AAA are inclined to the opinion that the high rate of production in May and June is responsible for a lull in buying. They also state that they are in a position to prove that the price levels for cotton goods before the processing tax was applied would have justified 16c. price for raw cotton. It also is pointed out that the tendency of raw cotton prices to decline probably was a more potent influence in drying up demand than was the processing tax.

Manufacturers, in their informal complaints registered with officials here, do not blame the processing tax solely for the decline in demand. They recognize the ordinary economic factors that work in that direction but, in addition, they point to increases in labor costs and in the price of everything which they have to buy. They claim that these factors have much more than offset the additional purchasing power that has been created as a result of payroll increases and the spreading of work.

There is no indication that consideration is being given to the possibility of reducing the processing tax. As a matter of fact, the thinking is in the other direction. The money must be found for the acreage reduction next year.

Although a studied effort is being made to say nothing about the elimination of the marginal manufacturer it is apparent that this is a very definite part of the Government's program. This is a politically-minded administration. Sight is not being lost of the fact that there are more consumers than there are producers. While it is necessary, in order to get quick action, to increase prices to the consumer steps from this time forward will be in the direction of reducing the price the ultimate consumer has to pay. This means that high-cost plants must be eliminated. Even now, high officials have before them a program calling for a determined drive intended to influence manufacturers in all lines to modernize their plants so as to reduce costs and make possible a reduction in the price the consumer pays. Such a policy is not likely to be adopted immediately. It will meet with resistance from labor and from those who think technological progress does more harm than good. The eventual adoption of that policy is believed to be inevitable.

Several groups of AAA investigators have been making careful studies of the situation in connection with the proposed establishment of compensating taxes on other fibers. As this is written, no reports have been submitted.

Since no collections under the processing tax have been made at the time of this writing no proof is available as to the correctness of estimates of the amounts the tax will yield. The Bureau of Internal Revenue, however, has ruled that cotton bags in actual use prior to Aug. 1 are not subject to the tax. The question is raised because large amounts of sugar, flour, cement and other commodities packed in cotton bags are in storage. Some had contended that these bags should bear their share of the tax.

POSTPONEMENT of the proposed informal hearing on the cotton processing tax, originally set for Sept 7, was undoubtedly a well-advised move. The postponement was made at the request of the textile industry. George A. Sloan, president of the Cotton-Textile Institute, in a telegram to George N. Peek, administrator of the A.A.A., stated that "because textile manufacturers have been operating under provisions of national industrial recovery code and processing tax for such short time we request that you postpone hearing set for Sept. 7 until such date as manufacturers are in better position to present to Agricultural Department authoritative data showing cumulative effect on manufacturing costs from both acts."

As indicated elsewhere in this issue, it is extremely difficult at this time to unscramble the effects of the codes, of the processing tax, and of the other abnormal influences which have been bearing on business during recent weeks. It will take a little time before such unscrambling can be accomplished. Consequently the industry was correct in seeking postponement of the hearing.—*Editor.*

WHAT ABOUT

New Products in Yarns?

Price competition should be lessened by the National Industrial Recovery Act and it is expected that yarn quality will assume its proper position as a dominating factor in selling. The following article discusses the possibility of going beyond the usual quality talk, which is largely confined to statements concerning evenness and breaking strength, by producing yarns more clearly suited to the specific requirements of the different classes of consumers. Enough has already been done along this line to indicate the potentialities.

STRICTLY speaking, there have been few "new" products in cotton yarns. There have been, however, a number of new developments. Analysis of a typical group of such developments reveals that the man who says that the yarn industry has been extremely backward in producing anything new and the man who says that there is no opportunity to create something different because most yarns are purchased on specification are both wrong.

In some lines the industry has made definite progress in producing yarns that are really "tailor-made" to fit the needs of a certain class of customers. On the other hand, there is evidence that yarn sellers have overlooked many bets because of inertia or because of the belief that the customer would not purchase anything that did not conform to specifications.

Although there is a certain amount of overlapping, the requirements for strength in cotton yarn fall into two general classifications:

One group of consumers requires a yarn with a sufficiently high breaking strength, as measured by the usual methods, to withstand the machine process of manufacture into cloth, braid, etc. As an example, in insulating wire it is important to use a yarn that will not break on a high-speed insulating machine; but once the yarn is on the wire its breaking strength is not an important factor.

A second group of consumers subjects the yarn to no unusual strain in the manufacturing process; but it does require a yarn that will meet certain stresses later on during the service of the product. Tire cord is an example. There is little strain on the yarn when the tire is being made but a great deal when used.

This second classification offers by far the most interesting field for investigation, but it must be admitted that not much investigating has been done. The average salesman considers that when he gives the customer a yarn with a high breaking strength, as indicated by the usual skein or single-end method of breaking, he has supplied the best possible product. Often this is not the case. A typical example will suffice:

A Raw Cotton Problem

A yarn consumer was producing an industrial fabric that was subjected to constantly recurring strains in later usage. Although a good grade of yarn was being used, results were not satisfactory. The only suggestion that the yarn salesmen could make was that yarn with a still higher break be purchased. Unfortunately, the price of a really excellent yarn was such that the fabric could not be produced on a competitive basis. Eventually the customer—not the yarn manufacturer—discovered that yarn spun from, say, a nice smooth, Georgia staple would give a high initial break but would not stand up well under certain conditions of periodic stress. On the other hand, a yarn spun from a rough, Texas cotton would not give as high an initial break but would withstand periodic stress better; the theory being that the Georgia cotton had more of a tendency to slip than the Texas when subjected to a long-time strain; as contrasted with the sudden strain applied by a strength tester.

Enough is known about the "character" of various types of cotton to assist the manufacturer in producing a yarn that definitely fits the needs of the consumer. Unfortunately this knowledge has not been widely applied. Too often the manufacturer thinks that if he produces a yarn that is even and has a good breaking strength he has done everything possible. A greater fund of knowledge on raw cotton and its characteristics

is needed, but the industry as a whole has been backward in cashing in even on what is already known. The Division of Cotton Marketing, U. S. Department of Agriculture, has done some excellent work in studying cotton "character."

Scope of Investigation

At this point it may well be asked how far the industry is justified in carrying on what might be called research work. In general it is apparent that the individual manufacturer, particularly since many of the units are small, cannot fairly be expected to carry on extensive research work along lines that lie far from his province. He should, however, in cooperation with the selling force, be alert enough to apply the knowledge that is already his. Some surprising results have been obtained by manufacturers who have merely used common sense and a little imagination in producing a yarn to suit the customer's requirements. In addition, it is not too much to expect the yarn manufacturer to carry on a certain amount of investigation in connection with such subjects as raw cotton, twist, etc., that fall definitely within his sphere.

Other questions that arise are whether specifications do not hinder the development of better yarns, whether it is worth while to expend time and money on developments which a competitor will immediately copy, and whether the industry has a real chance to develop quality salesmanship of a superior type. Probably the best way to answer the various questions is to cite several typical developments and incidents that serve to illustrate one or more points.

Taking up the scope of possible improvements in yarn, the Western Electric Co. offers an interesting example. In covering wire it was necessary to use silk in some cases as cotton did not offer a sufficiently high degree of insulation. Several years ago the Bell Laboratories set out to determine why it was that cotton was not so good an insulating material as silk. Through research, it was discovered that certain salts and impurities in cotton lessened its effectiveness as an insulator. A method was devised to remove these salts by "washing," and, as a result, increase the dielectric resistance of cotton yarn some hundred-fold.

Obviously the cotton industry could not be expected to carry on research of this type. The incident, however, serves to show the wide range of possibilities in the field of producing a quality yarn; using "quality" in the broad sense of the yarn best suited to the needs of the use to which it is to be applied.

The Question of Twist

Going to the other extreme, we have a purchasing agent asking several salesmen recently for a yarn with more elasticity than the average. All but one of the salesmen looked vague and turned the conversation in other directions. The single exception merely wired the mill to make up a few samples of very high twist yarn and of twist-on-twist yarn; the added twist giving the characteristic required. Certainly something is wrong when many salesmen are not supplied with ordinary run-of-the-mine information.

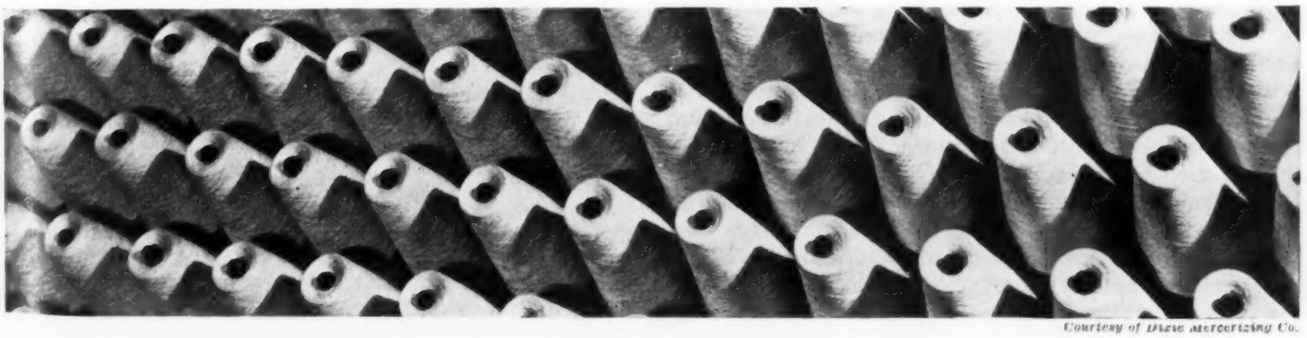
The highly advertised Goodyear "super-twist" tire cord is not really a "new" product, but it does represent the application of a particular twisting technique to secure a desired result. By the usual break standards, the "super-twist" cord is not so strong as other cords. It does, however, possess far greater elasticity and Goodyear claims that this greater elasticity makes the cord at least 60% more effective when used in an automobile tire. An interesting point is that Goodyear was able to secure patents covering the development.

Specifications have been instanced as a hindrance to new yarn developments. The wire covering industry is one of the largest users of cotton yarn bought on rigid specifications. It is significant, therefore, that when a manufacturer of insulating machines and a yarn manufacturer got together to turn out a new product, this product was bought for some months before any specifications were drawn up. The development referred to is the so-called "soft" insulating yarn, whereby single yarn is spun with a twist multiplier less than three so that it is soft enough to be flattened out when put through the new device on the insulating machine. By using this plan, it is possible, say, to flatten a 60s yarn, used to cover magnet wire, to such an extent that the thickness of insulation is no more than that usually obtained with the more expensive regular 80s.

Too often a specification is looked upon as an expression of what the customer wants. In many cases it merely represents the customer's choice from a group of standard yarns. When a yarn consumer finds it advantageous to do so, the matter of specification is pushed to the background as illustrated above.

In Conclusion

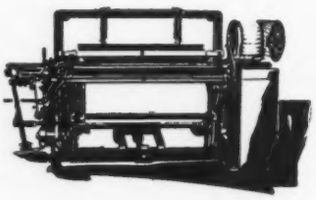
No one is rash enough to say that the yarn industry has an opportunity to create better yarns in every direction. Obviously the yarn industry, on a mass production basis, cannot be expected to make a "special" yarn for every customer. On the basis of the evidence, however, it is fair to say that if a yarn mill wants to sell on a quality basis it may be well worth while to do a little exploration along the lines of determining just what it is that will make yarn "quality" yarn for a certain class, or classes, of consumers. Anyone doubting that something can be done along this line has only to look around and see what *has* been done by thread manufacturers, by tire-cord manufacturers and by many progressive yarn manufacturers.



Courtesy of Dixie Mercerizing Co.

The Loom Test

CORRECTING CAUSES OF MACHINE STOPPAGE



By Richard White

SINCE the loom plays an immensely important part in the development of a textile product, and since it is particularly susceptible to the production of imperfect work, it is logical that we should give it a large part of our attention. Let us then see what benefits may be accrued by the application of a little intelligent research work on this machine. Although the discussion will be based upon the testing of 4x1 automatic Crompton & Knowles cam looms on heavy cotton work, many of the remarks may be applied to other looms.

Where piece-work rates are set upon a certain percentage of loom operation, it is quite as much the job of the management to make this goal attainable, or more often surpassable, as it is that of the operatives. The management's obligations in this respect are the supplying of good warps and filling; and the maintenance of an adequate supply of loom parts. If weavers find that they are being supplied with poor yarn or that looms are standing idle awaiting the arrival of new parts, they are quick to sense the laxity of the management and they will not put forth their best efforts to weave a maximum yardage of first-class material each week. Of course it is to the interest of all the help in the section to get off as high a production as possible, and in a properly operated plant their pay envelopes should often show an excess over the base pay rate.

In the case of warp stops, in order that the type of stop can be determined, it is essential that the weaver be instructed not to start the loom or tie in the broken end until the person making the test has had an opportunity to see it. Snarls and sized waste (hard, flattened lint adhering to the yarn) can be seen at a glance, but it takes a little closer scrutiny to determine whether a break is due to a weak place in the yarn or to the fact that a knot has slipped. A slipped knot usually leaves a clue in the fact that the end is curled up due to its having been tied and held so long in that position. In any event it is well to have the weaver break off about 6 in. of the yarn before tying in a new end so that the break can be carefully examined.

If the looms are running on such coarse work or on material that is finished in such a manner that it makes no difference whether the filling runs out in the middle of the fabric or not, then a feeler motion will not be necessary, and there will be no stops due to filling breaks, because the filling fork will be used to operate the bobbin-change mechanism. When the filling breaks or runs out, a new bobbin will be thrust into the shuttle even though the old one may be nearly full. Occasionally the battery hand should look in the filling can and extract these full or partly filled bobbins. Those that are full or are very slightly reduced may be put into the magazine; but if very much yarn has been removed, the bobbin should not be used, as it will not lie correctly in the magazine and may cause missdoffs. Yarn left on partially exhausted bobbins can be utilized by rewinding on a quiller.

Shelling-off of the filling is apt to cause considerable trouble unless particular care is taken in building the bobbin and in selecting the proper type of bobbin to use. In almost any test it is particularly noticeable that shelling-off is most frequent when only the last few layers of yarn remain on the bobbin. This yarn, when unwinding from the lower part of the traverse, rubs against the layers above it and drags them up on the smooth surface of the bare bobbin. The result will be one of three things:

(1) The loosened coils of yarn will run off all at once on the next trip of the shuttle, causing a defective place in the cloth.

(2) They will catch in the eye and break the yarn.

(3) The tangled layers on the bobbin will catch the filling and break it.

Only carefully conducted experimentation with different types of bobbins, various amounts of moisture in the filling, and different types of filling cams can provide the remedy for this trouble. Too much power on the pick will also be likely to result in shelling-off.

In selecting a shuttle, careful consideration should be given to the eye. It is well to remember that easy threading is a desirable feature, but in many cases easy threading is obtained by the use of an eye of such design that large slugs will be allowed to pass through and be woven into the cloth. If the type of work is such that medium-sized slugs are not objectionable, then non-threading of the shuttle should be negligible.

Two other troubles we are likely to encounter with filling, if running with a feeler, is running-out and breaking on the bunch. Both of these faults may be traced to the spinning room, where it will be found that an improper bunch is being made. Of course a defective feeler motion will allow the filling to run out, but this will betray itself by a recurrence of the trouble on the same loom a number of times. Where run-outs are few and far between, it is quite likely that they are due to the fact that either there is no bunch at all or that an improperly shaped bunch has been made by the spinner in piecing up an end which has broken down right after the doff. All spinners should be instructed how to make a suitable hand bunch; or, if this appears too difficult, it is wise to keep a number of bobbins on hand which have been returned from the weave room and which have the bunches left on them.

On very coarse filling some trouble may be encountered from slugs formed when the spinner pieces in a new roving. The usual custom when putting in a new roving is to break out the old end, put in the new roving, and then insert the new end into the small trumpet behind the back rolls. This procedure allows a half inch or more of the old roving to run in with the new, causing a heavy place or slug in the yarn. To eliminate this, instruct the spinner to piece the new roving directly onto the end of the old, allowing enough slack so that there will be no tension at the point of joining.

[In a later article this author will discuss mechanical faults and the preparation of the loom report.]

A Composite Worsted Mill

EMPLOYING THE BEST METHODS OF TWENTY SPINNING PLANTS

By Alfred Heaton

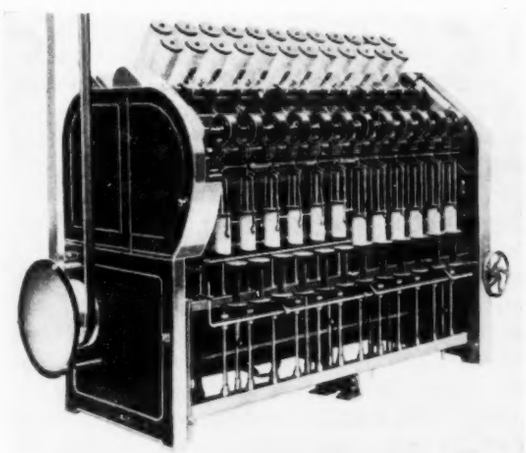
FOR a period of about fifteen years, young efficiency men, immaculately dressed with a half dozen freshly sharpened pencils protruding from their vest pockets, have been bustling about a goodly number of worsted mills. They know little about yarn manufacture, but the theory is that any idea they may conceive will not be hampered by the shackles of tradition. The mere presence of these efficiency men is often interpreted by mill men as a criticism of their ability.

Now experienced men can contribute many valuable suggestions for improvement, if they are given the proper opportunity and incentive. When not properly encouraged, they have little urge to think in terms of fundamentally improving the mill's methods. Efficiency men, on the other hand, have constantly in mind the idea of questioning the reasons for existing conditions and of making desirable changes. It is their business. Put in the right frame of mind, the mill man, with his technical knowledge gained by experience, can accomplish remarkable results.

Offering employees a cash bonus for acceptable ideas on improvements is an effective way of establishing the desired frame of mind, and it need not be a particularly expensive way. Besides proving quickly effective in bringing about improvements, it helps the feeling of loyalty among the employees, which in itself is an invaluable result.

It is not surprising that certain mills outrank others in the matter of efficiency when one considers the marked difference in methods employed by mills for doing the same thing. In this article and others I shall endeavor to assimilate in one efficient system a number of practical ideas on yarn manufacture culled from an acquaintance with some twenty of our leading worsted mills.

To begin with, let us consider drafts and doublings in drawing. The term "even drafts" implies that each operation shall draft the fibers to approximately the same extent, although in the opposite direction, of course. It is now quite generally conceded that such drafts in the drawing operations produce the best results, even to the point of selecting a roving weight which will permit the same draft to be maintained in the spinning.



Too many mills are producing fine roving for double-end spinning at high cost.

As to whether the roving should be double or single end, much can be said on both sides. However, several tests conducted by the writer showed no discernible difference, either in appearance or tensile strength, between yarns spun from single-end and those spun from double-end roving of the same weight and quality. Single-end roving necessitates heavier drawing deliveries, which serve to increase the production; while, by the same token, double-end roving creates lighter deliveries, which slow down production and increase the cost. Nevertheless, a good many plants are still making a double-end roving—the reason for which, it seems to me, is simply that it is a procedure they have always followed.

Take for example, the following single-end drawing layout: 8 drams $\times$ 6 = 48, $\div$ 1 = 48, $\times$ 6 = 288, $\div$ 2 = 144, $\times$ 6 = 864, $\div$ 4 = 216, $\times$ 6 = 1,296, $\div$ 5 = 259, $\times$ 6 = 1,554, $\div$ 5 = 311, $\times$ 6 = 1,866, $\div$ 5 = 373. Compare this with the following double-end drawing layout: 8 drams $\times$ 7 = 56, $\div$ 2 = 28, $\times$ 7 = 196, $\div$ 2 = 98, $\times$ 7 = 686, $\div$ 4 = 171, $\times$ 7 = 1,197, $\div$ 5 = 239, $\times$ 6 = 1,434, $\div$ 5 = 287, $\times$ 6 = 1,722, $\div$ 5 = 344. Obviously, if in the double-end schedule, the drafts of seven were followed throughout, the delivery at the gill box would become rather too heavy to handle; while without a draft of seven in the last four operations, the deliveries of the entire set would be much too light to give the required production. Then, too, an operator can handle three roving frames on single-end easier than two on double-end, which again cuts production costs. With double-end roving a considerable amount of waste is caused by one of the ends falling and permitting the other to run single. The single is frequently not pulled off by the roving operator, and it goes to the spinning only to be sent back again to the drawing.

Probably about 50% of our mills today are making the double-end roving, which, with its excessive cost, hardly leaves them in a favorable position to compete with the mills making single-end.

Another topic which has been the subject of considerable controversy recently is the relative merits of the ring rover and flyer rover. There is much to be said in favor of the former machine. It operates with an easy, even tension obtainable heretofore only in cone drawing, with none of the intricacies, the heavy machinery, and incidentally the high cost of upkeep con-

nected with cone drawing. Ordinarily it runs at a speed a little over twice that of the flyer rover, thereby effecting a marked saving in floor space by doing twice the work in the same space and at the same time centralizing the operator's efforts.

Any number of worsted mills have been forced to sacrifice quality to a certain extent by making roving sliver on the heavy side in order to get the production through the rovers. Particularly has this been the case in mills spinning fine counts. This situation can be eliminated by the adoption of the ring rover. Flyer roving frames now operating with a 6x3½-in. bobbin can be changed to ring using an 8x4-in. bobbin.

At the moment the writer has in mind a fairly large mill that is using the flyer rover and making the small 6x3½-in. package. The spinning operators in this plant are running three sides. As the large 8x4-in. ring roving package is a bit barrel-shaped when full, it contains almost twice the amount of sliver that the 6x3½-in. package contains. Assuming the small package runs out every day in the spinning, an operator running three sides at the end of four days would have filled in twelve times. Whereas if she had had the larger ring roving package, running four sides, she would have filled in only eight times at the end of four days. This would mean that only three-quarters the former number of spinners would be required on a change-over.

At the end of the year production lost by roving ends running out in the spinning amounts to a considerable figure, to say nothing of the waste that is necessarily connected with each filling-in of the spinning frame. In addition to this there are the defects caused by the imperfect piecings a spinner occasionally makes as she is hurrying to fill in the side. If the piecings caused by roving ends running out are cut in half, the quality of the yarn is bound to improve.

New Method for Merinos

REDUCES COST AND RETAINS QUALITY ON COTTON SYSTEM

By H. W. Swan

MERINO yarns have long been spun on the cotton system. My first experience with these yarns was on a rather crude mix composed of colored wool waste and middling cotton. The idea was to get a product that would compare in color with the worsted yarn used so extensively by the underwear knitters.

Merinos are made in many ways, depending on the ability and skill of the spinner. The cheapest and most common way is to lay down a mix composed of certain proportions of wool waste and middling cotton. The usual proportion of wool is from 10 to 40%. Naturally this is a yarn of poor quality, but it answers the purpose in some cheap part-wool garments.

A much better yarn is made from cut standard tops and 1⅛ to 1¼-in. combed cotton, generally of Tanguish or Rough Peruvian. This mixture may be laid down in the opening room and then run through in the regular way; or the wool tops, after being cut to the desired length, may be run through a wool or roller card equipped with a split doffer and combined with the combed sliver at the drawing frame. This is the method generally used in the better mills.

After many years' experience with the different methods used in producing these yarns, and not being entirely satisfied with any of them, I started out on a tour of inspection that included a number of French merino spinners, as well as the Bradford-worsted and the woolen spinners. Not to overlook any of the details, I took in the machine shops that made various kinds of wool-spinning machinery.

I brought back from my trips a variety of ideas, some good and others not practical for cotton machinery. In one French-worsted mill I saw the possibility of drawing short tops and reducing them to a size comparable to combed cotton sliver. This was the main idea in the method I developed. To accomplish this I took an old single-head cotton-drawing frame equipped with metallic rolls and reduced the top sliver to a weight convenient to use on a second similar frame. This not only reduced the weight of the sliver but also broke the fibers if they were longer than the rolls were set for. To overcome the effect of the static electricity, I used a steam jet directed toward the tops in back of the frames, and also an atomizer head to produce additional moisture.

In this method it is necessary to have the sliver from the second drawing frame of only the proper weight to give the desired wool percentage when combined with the combed sliver at the drawing frames that follow directly. Two frames of drawing are generally used, and the result is a well-mixed sliver that runs exceptionally well on the fly and spinning frames.

It may be necessary to use a slip draft on the fly frames, and this can be easily arranged by removing the weight from the middle roll. It may be necessary in some cases to use a special saddle that will span the middle rolls. The No. 4 Dixon saddle will give this result on the spinning and allow the rolls to be set fairly close. This method does away with the excessive wool-waste percentage on cards, which I have found to be as high as 60% in top and cylinder strip.

The usual colors in worsted yarn can be mixed at the drawing to obtain the same effect as in the regular French-spun yarns. Yarns from this method of spinning have been spliced on regular French-spun yarn and then knit, and the result found to be in every way satisfactory. The fabric was just as smooth, and the yarn showed no thick and thin places. The cost of producing this yarn is much less than that of any other merino yarn of equal quality. It has been spun on a production basis and the results have been found fully as satisfactory to the spinners and knitters. The fact that there is no wool waste except that made at the drawing frame is of great importance as a cost item, and the small amount made at this point can be easily reworked into top sliver.

Warmth Without Weight

STUDY OF BULKINESS IN KNIT GOODS YIELDS INTERESTING DATA

By William Davis, M. A.

IN VIEW of the fact that knitted fabrics are known to exemplify the expression of warmth without weight in a remarkable manner, it is surprising that this feature has not been more definitely measured and exploited by the knit goods manufacturer. Since there is a relation between the thickness of the fabric and its thermal conductivity, one method of making this measurement is to adopt some system of determining the thickness or bulk of the fabric, finding the weight of the fabric, and expressing these two items in some definite relation to each other as the thickness weight index.

Weight is conveniently expressed as the number of ounces contained in a square yard of fabric. To obtain the weight per square yard it usually suffices to weigh a small sample of the goods, determine its area, and calculate the weight in ounces per square yard.

There are various methods of finding the thickness of fabric. The one here used has been to adopt the roller caliper. This instrument consists of a short lever on a fulcrum. At one end is a roller which rests on the cloth, with always the same pressure. The other end takes the form of a pointer which swings around an indicator dial according to the thickness of the fabric. This dial is measured off in divisions which can be read to thousandths of an inch. The roller rests on one point only of the fabric; and for certain types of cloth which have an irregular surface it is an advantage to use a plate under the roller which will give an even reading. However, with the range of fabrics employed in these studies, no difficulty was experienced except in measuring corrugated fabrics, such as the lace or open-work type and those with nub stitches. In general, for such fabrics, the thickness was measured to the outside ridge rather than in the hollow, for it is considered that the amount of air in the hollows has some effect on increasing the heat-retaining property of the fabric.

Measurement of a wide range of knitted fabrics shows them to be classified into various groups. There are, for example, the heavy and bulky textures of the purl-stitch fabrics, which have a variable surface and inclose a large proportion of air between the ridges or furrows. Then there are the plainer textures and those from the jacquard machines which are less buoyant and bulky. Also we find knitted fabrics of rayon which have still less bulk and weight. And last of all are the woven goods which have been taken as a means of comparing the knitted and woven fabrics used for similar purposes.

The weight in ounces per square yard, thickness in inches and the thickness/weight factor of the woven fabrics are given in Table I. The calculation for this index is made by multiplying the thickness by 100 and dividing the product by the weight expressed in ounces

TABLE I. CHARACTERISTICS OF WOVEN FABRICS

Fabric	Weight in Oz. per Sq. Yd.	Thickness in Inches	Index No.
Woolen overcoating	17.13	0.108	0.63
Woolen overcoating	14.36	0.090	0.62
Harris tweed	13.36	0.068	0.51
Cheviot suiting	11.50	0.032	0.28
Cheviot suiting	10.80	0.034	0.31
Worsted suiting	9.60	0.024	0.25
Dress goods	8.24	0.040	0.49
Smooth-face worsted	7.80	0.022	0.28
Worsted trousering	7.60	0.016	0.21

Other samples of woven goods gave the following index numbers: 0.32, 0.37, 0.35, 0.34, 0.31, 0.30, 0.29, and 0.29.

TABLE II. CHARACTERISTICS OF RAYON KNIT GOODS

Fabric	Weight in Oz. per Sq. Yd.	Thickness in Inches	Index No.
Plain 70-denier	1.77	0.008	0.45
Plain 120-denier	2.13	0.010	0.47
Plain 140-denier	2.83	0.014	0.49
Plain 140-denier	2.83	0.016	0.56
Plain 145-denier	3.00	0.016	0.53
Crepe 150-denier	3.19	0.013	0.40
Plain 120-denier	2.12	0.012	0.57
Tuck 120-denier	2.83	0.012	0.42
Plain 175-denier	3.54	0.016	0.45
Plain 175-denier	3.54	0.016	0.45
2/1—1/1 cut presser 175-denier	3.54	0.020	0.56
Crepe 175-denier	3.54	0.018	0.51
Tuck pattern 200-denier	4.21	0.016	0.38
1x1 rib 266-denier	5.40	0.035	0.64
Tuck pattern 400-denier	6.56	0.022	0.34

TABLE III. CHARACTERISTICS OF PLAIN-STITCH AND JACQUARD KNIT GOODS

Fabric	Weight in Oz. per Sq. Yd.	Thickness in Inches	Index No.
Jacquard bird's-eye	17.00	0.064	0.38
Half cardigan	13.74	0.104	0.75
Double jacquard	14.17	0.060	0.42
Plain 2/24s worsted	9.60	0.040	0.42
Double jacquard	7.90	0.050	0.63
Plain 8s cotton	7.40	0.036	0.49
Lace stitch	7.08	0.070	0.99
Plain 7s cotton	6.87	0.037	0.54
Plain 13 1/2s worsted	6.60	0.034	0.51
Jacquard 2/40s worsted	6.40	0.042	0.65
Plain 17.6s cotton	3.70	0.022	0.59
Plain 24s cotton	3.15	0.021	0.66
Plain 32s cotton	3.00	0.016	0.53

TABLE IV. CHARACTERISTICS OF KNIT GOODS EMPLOYED CHIEFLY FOR OUTERWEAR

Fabric	Weight in Oz. per Sq. Yd.	Thickness in Inches	Index No.
1x1 purl 3.5s worsted	16.50	0.110	0.67
1x1 purl 12.5s worsted	13.30	0.106	0.79
1x1 rib 7s cotton	11.80	0.058	0.49
1x1 purl 4s worsted	10.60	0.106	1.00
Half cardigan 2/10s worsted	8.80	0.068	0.77
1x1 purl 3/16s worsted	8.75	0.086	0.98
1x1 rib 13s worsted	8.14	0.062	0.76
1x1 rib	7.80	0.050	0.64
26-gage terrot-tuck	6.37	0.028	0.44
1x1 rib 17s worsted	6.80	0.064	0.94
Reverse-plated hose fabric	5.67	0.022	0.39
1x1 rib 32s cotton	5.20	0.035	0.67
Half cardigan 13s worsted	4.12	0.040	0.97
Interlock fabric 64s cotton	4.90	0.024	0.50

per square yard. Thus in the first example the figures are (0.108 × 100) ÷ 17.13 = 0.63 which is termed the index.

Nine examples are given in detail with descriptions of the type of cloth as used for outergarments, and eight further examples are given of common indices used for ordinary classes of woven goods for men's wear. These figures are arranged in progressive order and drawn out as a graph in Fig. 1 along the line marked *W*. The numbers along the bottom line show the individual tests, while those up the side give the thickness/weight indices.

The next set of measurements shown in Table II are those on a series of rayon knit goods which range in weight from very thin textures with a weight 1.7 oz. per sq.yd to one of 6.56 oz. per sq.yd. These textures are for the most part plain and are given in a range of yarn counts varying from 70 to 400 denier. The indices arranged in a progressive series are shown in graphical form in the line marked *R* in Fig. 1.

The next series (Table III) shows a distinct increase in the thickness/weight index and represents the very useful range of fabrics of the plain-stitch variety and in the various jacquard stitches which are so largely used for knitted outerwear. This range extends from a heavy jacquard fabric weighing 17 oz. per sq.yd. to a thin texture of 3 oz. per sq.yd. The first two fabrics are heavy, but the second has a higher index owing to its greater thickness; the lace-stitch fabric is also worthy of examination as it has an index figure of 0.99, which is the highest in this series. These indices arranged in progression are shown in line *K* of Fig. 1. It will be noted that the contour of the line marked *K* shows a decided rise as compared with the lines for rayon knit goods and for woven fabrics.

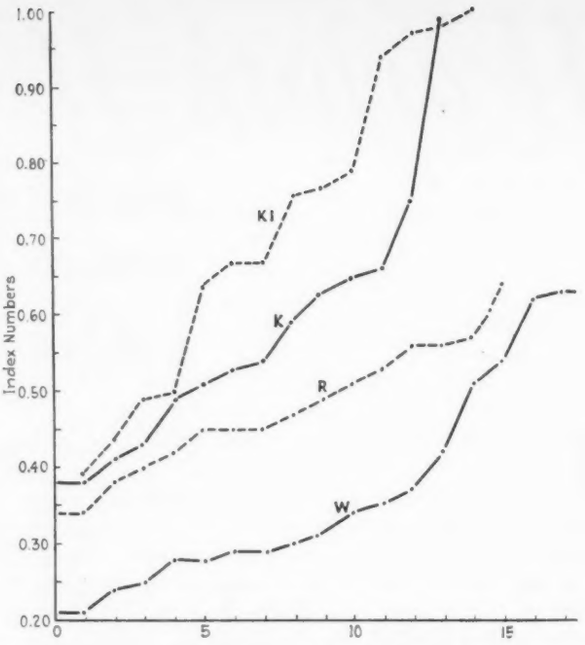


Fig. 1. Thickness/weight factors of typical woven and knitted fabrics

The final series given in Table IV includes the bulkiest types of knitted fabrics, those of the purl-stitch and rib class, half-cardigan, and interlock fabrics. These range from a weight of 16.5 oz. per sq.yd. to a lightweight interlock texture of 4.9 oz. per sq.yd. The indices arranged in progression are shown in line *K* I in Fig. 1.

Ageing—Some Engineering Problems

AT the annual conference of the Textile Institute, held in Harrogate, England (TEXTILE WORLD, August, 1933, p. 76), H. B. Briggs, of the Imperial Chemical Industries, Ltd., discussed certain of the chemical and mechanical problems connected with the ageing of vat-color prints which require further study and suggested some modifications in the ageing procedure. An abstract of Mr. Briggs' remarks follows:

When cloth printed with the normal vat printing paste enters the atmosphere of steam, it rapidly absorbs moisture. The absorption of water regenerates the latent heat of vaporization of water to steam, which raises the temperature of the fabric. The heat generated rapidly raises the temperature of the steam and so creates a dry atmosphere which reduces the tendency of the fabric to absorb more moisture and retards or prevents fixation of the dyestuff. By copious supplies of steam this rise in temperature can be counteracted to some extent, provided that the internal circulation of steam is efficient. There appear to be two opinions, as to the better way of providing for the exit of the spent steam; the first is that mouthpiece ventilation is sufficient, while the second is that ventilators at the rear of the machine are essential. Similarly there are several ways by which the steam is allowed to enter the machine: from the steam main via perforated pipes along the bottom and/or the top, from perforated pipes placed between the folds, or by boiling water in the bottom of the machine by closed steam coils. Whichever method is adopted, it can only give satisfactory results when the steam has ample circulation facilities; and herein lies what is probably the biggest problem in ageing practice.

Under E. P. 282,133 a system has been devised by which the steam is circulated across the folds of the fabric. An ager built on this principle possesses cone-shaped fixtures on the sides. These are joined by a wide tube in which is placed a circulating fan. By this means the steam is circulated and accumulations of superheated steam under the tops of the folds are prevented.

Dissipation of the heat generated by the use of copious supplies of steam suffers from the drawback that the increased temperature of this steam affects the whole of the interior of the machine; and were it possible to remove the heat in the regions in which it is formed, more regular results would be obtained.

Cooling of the rollers internally would achieve to a large extent this object. As cooling agents neither water nor steam could be used, for water drops would result from steam as the rollers would collect water when the machine was stationary, and it could not be removed sufficiently rapidly by any system of buckets. Air heated to a temperature of say 216° F. would be free from these faults; and if steam at a pressure of 3 to 5 lb. were used as the heating agent, a regular temperature would be obtained. Also the working conditions in that portion of the ager in which fixation rather than reduction of the dyestuff occurs would be much easier to control.

New Seriplane Standards

IMPROVE CLASSIFICATION OF RAW SILK

By D. E. Douty
Vice-President and General Manager
United States Testing Co., Inc.

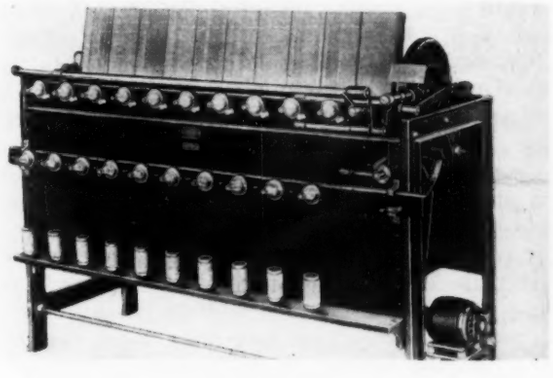
AT THE second International Technical Raw Silk Conference, held in New York the latter part of 1930, the present official standards for raw-silk classification were thoroughly considered and ways in which they could be improved were discussed. Since the conference the Raw Silk Classification Committee of the Silk Association of America, Inc., has been engaged in a re-study of the present official standard photographs for evenness, cleanness, and neatness. The results of this investigation are summarized in the following paragraphs.

The present official evenness standards were selected several years ago by members of a sub-committee and were rated entirely by visual impression. No attempt was made to measure the differences in denier of the various stripes. The negatives were made by placing the photographic plate directly under the panels of raw silk and making a shadowgraph.

When prints were made from these shadowgraph negatives, they lacked the perspective and definition of a true photograph; and it was impossible to make them resemble the natural silk very closely. From micrometer measurements made with a microscope it was found that the relation between the panels was irregular and without a definite progression. In addition the 90% panel was decidedly faulty, and the cloudiness of the 100% panel caused differences of opinion as to how far similar cloudiness in other panels should be overlooked.

It was also realized very early that the omission of a 60% panel from the set was a mistake. After the standards were selected, the idea of the penalty or low average was introduced and developed. The necessity for more accurate estimating of the more uneven, low panels became apparent. The 20% steps in the low end of the standards became a real weakness.

Following the conference mentioned above the Raw Silk Classification Committee designated a sub-committee on standard photographs, and active work on the revision was started. The research department of the United States Testing Co. had continued to study the problem of the photography of the panels and had made decided improvements in the application of direct photography. A large camera with special mounting to eliminate vibration and with a capacity for plates up to 20 x 20 in. was purchased. Many studies were made to determine the best type of plates and photographic papers. The Silk Association of America had no funds available for this work, and conditions in the silk industry have been such for the past four years that it was impossible to raise a special fund for the purpose. Therefore the burden of carrying on the experimental work of the committee has fallen almost entirely on the United States Testing Co.



Evenness Standards

It had been decided to attempt to select the new standards on a pre-determined denier-variation basis instead of visual impression and to have the unevenness increase according to a definite progression. It was also decided to attempt to have the main portion of the panels normal silk. There has been a general feeling in the Classification Committee that raw silk which varies not more than 2 deniers, either finer or coarser than the average denier, should be considered normal. It was found that a sudden change of 2 deniers in a 14-denier raw silk made a stripe that was just perceptible to the eye as a definite stripe at a distance of about 7 ft., the established distance for estimating seriplane panels for evenness.

The United States Testing Co. assigned to its raw silk inspection department an inspector who had had extensive experience in the standards work. This inspector examined all seriplane boards of evenness tests passing through the department and selected such panels for further study as appeared to be suitable for standard panels. When a panel was found which under magnification appeared to be satisfactory, seven negatives were made with the special camera. The panel of raw silk was then made into 9-meter skeins, which were carefully weighed on a delicate balance. If the background of the panel was normal silk and the stripes were of such a number, width, and degree of variation as to produce the necessary amount of unevenness for a particular percentage rating as determined by the arbitrary denier-variation table, the panel was retained as a preliminary standard.

It was found unnecessary to have a photograph 18 in. long as standard; and therefore to improve the definition of the prints, the standard photograph was reduced to 14 in. thereby omitting 2 in. of each end of the photograph where the focus could not be quite as sharp. When the set of negatives was finally selected, several prints were made and sent to the cooperating laboratories for trials. Following several months of trial slight modifications were made and the practical trials were repeated. These practical trials have required more than one year.

By a series of intercomparisons between the present and proposed standards it has been possible to so adjust

the new standards of evenness that the grade levels are not disturbed. For example, a raw silk which is rated as having 85% evenness by the present standard, would continue to be rated approximately 85% by the proposed standards. The mounting of the standards has also been improved. The panels are mounted about 2 in. apart and the neatness standards are mounted on the reverse side.

Neatness Standards

The present neatness standards consist of an 80%, 60%, and 40% panel. These were, like the present evenness standards, selected by visual impression. Experience has shown that neatness standards with 10% steps are desirable and that these steps should be made by a suitable fixed progression which would rate the neatness of a normal raw silk in proper relation to its evenness. Use of the present standards revealed that they are too liberal, especially in the upper and lower grades. The 60% panel appeared to be about the proper value and it was therefore taken as the reference panel. Seven new panels, with 10% steps were selected and rated from 100% to 40% by 10% steps. The 100% panel is perfect, with no defect visible to the eye when examined at a distance of approximately 2 ft.

The 90% panel has 10 defects, the 80% has 20 defects, the 70% has 40, etc., doubling each step downward to 50%, where the multiplier was changed to approximately 1.75 for the two lower panels, as it was found that continuing the multiplier 2 made the lower panels too liberal.

The upper panels of the proposed set lower the neatness percentages about 4% below the present imperfect standards, the middle panels about 1% and the lower panels about 2%. They are in this relation about the same grade level as the neatness standards of the Japanese and should therefore be acceptable to the Japanese. It is believed that with the new standards the neatness percentages in the classification can be set at the same percentage value as for evenness in the same grade. Neatness can be estimated with much greater accuracy by the proposed standards. They are to be mounted on the reverse side of the evenness board with 2 in. between each panel so as to make the differences between them more apparent and thus assist the inspector in deciding his estimate.

The Classification Committee has conducted no research upon the major and minor defects classified as cleanness. The standards photographs presented by the Japanese at the Second Technical Conference agreed so closely with the American grouping and definitions that the committee has decided to accept and recommend them. They have one weakness. They are magnified so that both the thread and defect appear larger than the natural size. This weakness the Japanese have agreed to rectify by re-photographing the defects to natural size.

Seven sets of primary photographic standards are now available; and if they prove as successful as the Classification Committee has good reason to feel they will, it should be several years before the American raw silk market is required to undertake further revision.

Full-Fashioned Defect

RECORDED BY THE CAMERA

By Herbert C. Roberts

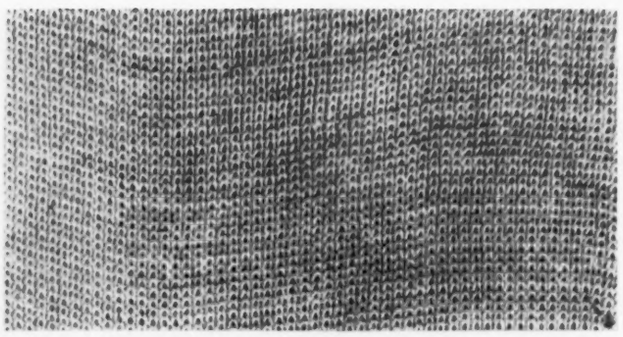


Fig. 1. Mottled appearance noted in cotton top of men's hose

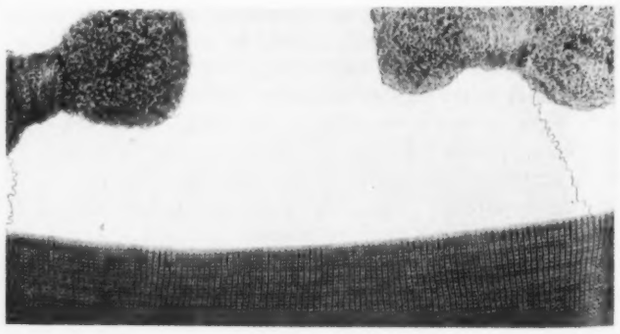


Fig. 2. Defect traced to use of two types of yarn and improper plating

AFTER a lot of men's full-fashioned hose had been dyed, a mottled effect was found in the cotton top. This defect, which is shown in Fig. 1, was attributed to faulty dyeing. The dyer felt certain, however, that he was not to blame. Therefore he cut up one of the stockings, unraveled part of the top, and with a camera made a record of what he discovered.

In Fig. 2 the real cause of the defect is made evident. The top, we see, was composed of two distinct shades of yarn. Each was evenly dyed, but the two yarns did not take the dye the same. The trouble was not due to improper dyeing but to an error in knitting.

Specifically the knitting defect was one of faulty plating. One of the yarns used was a gassed yarn of one size, and the other was a mercerized yarn ten numbers finer. Further examination of the hose disclosed that of these two yarns one had been employed in knitting the heel and the other in making the sole. Accordingly a slight variation in shade was noted between these parts.

It was concluded that if the plating of the top had been correct, there would have been a difference in shade between the inside of the top and the outside. However this would not have been any more noticeable than the change in color between the heel and sole.

Researches on Fulling

POINT WAY TO MARKED CHANGES IN MILL PRACTICE

By J. B. Speakman, D. Sc., F. I. C., F. T. I.
Leeds University, England

◆ *Recent investigations of shrinkage in fulling have already led to improvements in fulling-mill construction and have paved the way for even more revolutionary changes in design. In the following article Dr. Speakman, who himself has contributed largely to our better understanding of the theory of fulling, points out the industrial significance of the latest research in this field.*

IT IS now well known that the determining cause of shrinkage in wool fabrics is the surface-scale structure of the fibers. Under the action of the rotary machine or the fulling stocks the fibers tend to migrate in the direction of the root end, because the projecting scales oppose motion in the direction of the tip. Fiber travel of this kind causes shrinkage, but the different fulling properties of various wools are not determined solely by different degrees of scaliness; and in general the shrinking properties of a wool increase with increasing scaliness, length, fineness, and crimpiness of the fibers.

No matter how favorable these four properties may be in any particular wool, shrinkage cannot occur unless a fulling agent is used. The presence of water is essential, but the rate of shrinkage is determined to a great extent by the pH of the solution. Between pH 4 and 8 shrinkage is independent of pH and takes place relatively slowly; but between pH 4 and 0.5, and between pH 8 and 10, increasing acidity and alkalinity, respectively, cause an increase in the rate of shrinkage. Any increase in alkalinity beyond pH 10 causes a fall in the rate of shrinkage.

The action of acids and alkalis in increasing the rate of shrinkage of wool fabrics in a fulling machine has been attributed to the increased swelling which these reagents induce in wool fibers. That swelling plays no direct part in facilitating shrinkage can be readily seen from the following experiments: When either soap or acid is used as the fulling agent, the rate of shrinkage increases with rise of temperature up to 110° F. and then falls. If different rates of shrinkage are due to different degrees of fiber-swelling, the swelling of wool fibers in water should increase with rise of temperature up to 110° F. and then fall; but the exact opposite was found to be the case. Similarly, the swelling of wool fibers in hydrochloric acid can be depressed by the addition of common salt; and if fiber-swelling plays an important part in fulling, the rate of shrinkage of wool fabrics, when hydrochloric acid is used as the fulling agent, should be less in presence of salt than in its absence. Actually, the addition of salt increases the rate of shrinkage. Quite clearly, therefore, increasing acidity, alkalinity, and temperature do not increase the rate of shrinkage by altering the swelling of wool fibers. Their whole purpose is to alter elastic properties.

Recent research has shown that the ease with which wool fibers may be stretched is independent of pH between pH 4 and 8, and increases with increasing acidity and alkalinity outside this stability region. Similarly, the ease of extension of wool fibers in water at any pH increases with rise of temperature. Evidently there is a close parallel between ease of fiber extension and the rate of cloth shrinkage in so far as the action of acids, alkalis, and temperature is concerned. It seems clear that the fiber travel caused by scaliness is hindered by the close binding of the fibers in the yarns of the fabric. For such travel to occur, the entangled fibers must be stretched by the pressure applied in the fulling machine spout. During extension, the fibers penetrate other entanglements, but when they escape from the applied pressure, contraction occurs and those parts of the structure through which they have penetrated are drawn together.

That this view is correct is emphasized by the fact that it is able to explain the existence of a critical temperature for fulling at 110° F. and a critical alkalinity at pH 10. Since the ease of extension of wool fibers in water increases up to 212° F., the existence of a maximum rate of shrinkage at a much lower temperature must be determined by peculiarities in the power of recovery of fibers from extension. Experiment showed that the ability of stretched wool fibers to contract in water decreases with rise of temperature above 105° F. Similarly, while the ease of extension of fibers increases with increasing alkalinity of the fulling agent, their power of contraction in strongly alkaline solutions is so small that fulling is retarded when the alkalinity of the fulling agent exceeds the critical figure defined above. Acids, on the other hand, have the remarkable property of facilitating fiber extension without interfering with the power of contraction.

For fulling shrinkage to be possible, it is evident that a fiber must possess well-defined surface scales, be easily stretched, and retain the power of recovery from extension. If fiber-extension is so essential in fulling shrinkage, it is evident that existing fulling machines which induce such extension by purely compressive forces are not necessarily the most efficient. With these considerations in mind, one maker has fitted the bottom of the spout of the fulling machine with a set of wooden rollers, which are driven backwards against the feed of the cloth.

In this way, increased pressure is applied to the cloth, which has to travel along and escape from the spout against the drag of the rollers. As a result of this modification, the time of fulling of union cloths was considerably reduced and fabrics of greatly improved handle were the result. There can be little doubt that further improvements in fulling-machine construction must be expected, and that this is but one of the developments.

Unit Heaters

INSTALLATION AND OPERATING METHODS WHICH INSURE HIGHEST EFFICIENCY

By Charles L. Hubbard

◆ *In our March issue Mr. Hubbard described some of the advantages of unit heaters for textile mills. He now discusses briefly the several types of unit heaters which are available and indicates the ways in which they should be installed and operated to give best results.*

IN ORDER to make clear the principles involved in the installation and operation of unit heaters it is well first to touch very briefly on the details of construction of the fans and heaters in most common use. As a majority of the units of this type make use of a disk or propeller fan to reduce the cost both of manufacture and operation, it is necessary to employ a shallow heater of fairly open pattern which keeps to minimum the resistance to air flow. Furthermore, lightness and high efficiency are essential in order to reduce bulk and to simplify methods of installation and support.

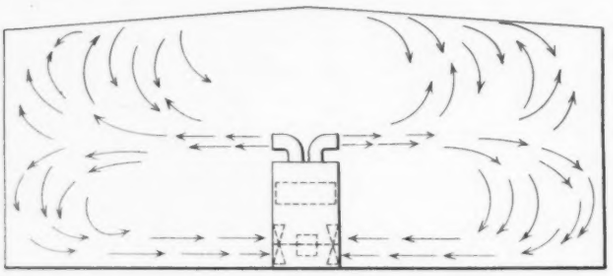


Fig. 1. Air flow with unit heater which rests on the floor

These considerations have led to the use of "extended surface" or "fin" tubing, which has a heating surface approximately fifteen times that of a smooth tube per foot of length. Brass or copper is commonly employed as the material, and the heaters in many cases resemble an automobile radiator.

The low resistance of such a heater and the absence of distributing ducts make it possible to employ a propeller fan in the majority of cases. This type of fan has a high efficiency at a resistance point near its wide-open volume, and is considered by many engineers the best form for general use in this connection. This is true not only on account of its lightness and high efficiency, but also because it has a virtually self-limiting horsepower characteristic. Therefore this type avoids any possibility of overloading the motor when the unit is used in connection with short distributing ducts and dry air filters where operating conditions might cause considerable variation in resistance. For long air travel and high velocities the centrifugal fan is still employed, although specially designed propeller fans, in combination with suitable diffusing chambers, have produced discharge velocities of 1,000 to 1,800 ft. per minute.

The location of unit heaters is a matter of much importance and should be carefully considered in connection with the manufacture of the particular type of heater it is proposed to use. Owing to the variety of conditions to be met as to size of buildings, shape and relative dimensions, type and arrangement of machinery, etc., there are no standard methods of placing the heating units, and each engineer follows his own ideas to a considerable extent. The result sought with a heater of this type is to so direct the air current as to give a slow movement to the entire air contents of the room, which will evenly distribute the warm air and return the cooler air to the heater without churning or the production of unpleasant drafts. Another desired result is to hold the warm air to the lower part of the room.

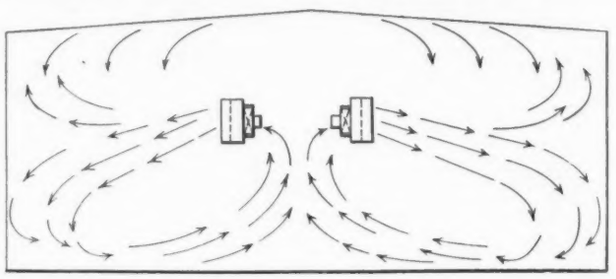


Fig. 2. Air flow with overhead arrangement of unit heaters

General Types

Two general types of heaters are employed: those resting on the floor, as shown in Fig. 1; and the overhead arrangement shown in Fig. 2. In the first of these the air is discharged horizontally or slightly downward at a height of 8 or 10 ft. above the floor, with the result that the air movement will approximate that indicated by the arrows. This tends to confine a considerable proportion of the heat to a stratum in the lower part of the room where most needed by the occupants.

The natural buoyancy of the warm air is partly overcome by directing it slightly downward as it leaves the heater. This effect is assisted to some extent by the cooler air settling from contact with the roof and upper walls, thus lowering its temperature and causing the entire body to fall gradually as it returns to the heater along the floor. Much the same result may be obtained by use of overhead heaters, as shown in Fig. 2, the units

being tilted or provided with special deflectors for throwing the air downward. While the general movement indicated in Figs. 1 and 2 is sought in most cases, the initial direction of discharge will depend somewhat on the height of the unit above the floor and other local conditions previously mentioned. Any arrangement which draws the return air from near the floor tends to produce the desired result by keeping a large proportion of the air in the lower part of the room where it is most needed.

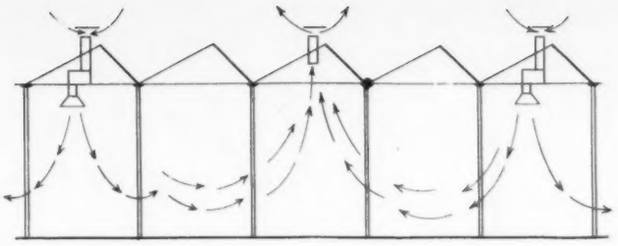


Fig. 4. Heating large buildings of saw-tooth construction

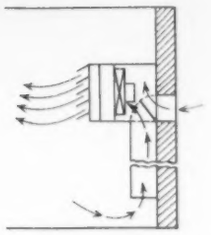


Fig. 5. Either inside or outside air supply

The floor type of heater, from its general design, takes its air from near the floor, and the same result may be obtained with the wall or overhead type by carrying down a return duct. In many cases, however, satisfactory results are obtained without this when the warm air discharge is properly directed, although there is more likely to be short-circuiting. Recently special attention has been given to the design of diffusing chambers and deflectors at the heater, which in connection with a suitable propeller fan, will discharge the air at such a velocity that when located at an elevation of 18 to 20 ft., it will displace cool air forcibly from near the floor at a distance of 50 ft. from the discharge outlet.

Diagrams shown in Figs. 3 to 3*E* inclusive, show some of the more common arrangements employed. In rooms within the capacity of a single unit, either of the arrangements shown in Fig. 3 may be employed. In larger spaces, calling for two heaters, double outlet units placed in diagonally opposite corners may be used, Fig. 3*A*. For a larger and wider building the arrangement shown in Fig. 3*B* may be employed; and for a still wider one the heaters may be placed on posts some distance from the walls, or hung from overhead, as most convenient, Fig. 3*C*. Still another arrangement for a room of this general type is illustrated in Fig. 3*D*. A scheme which tends to relate the entire air contents of the room is shown in Fig. 3*E*.

Large one-story buildings, with roofs of saw-tooth construction, have been successfully warmed and ventilated by the method shown in Fig. 4. In this case the air or a portion of it is drawn from outside as indicated. With this arrangement the air is discharged directly downward through a special diffuser; and means should be provided for drawing the air from out-of-doors or for recirculating it within the building by the use of switch dampers. An arrangement for either outside or inside air supply, with the heater located against an outside wall, is shown in Fig. 5.

Connections and Control

Under ordinary conditions unit heaters are connected with the same steam supply which would be used for direct radiation. This, in most cases, is exhaust, supplemented with live steam at a reduced pressure when necessary. Should conditions be such, in any particudar case, that live steam is employed wholly for warming the buildings, a considerable amount can be saved on cost of installation by carrying a higher pressure of 50 lb. or more, which permits of smaller piping and less radiating surface. It is usually desirable to place a vacuum pump on the main return line, with thermostatic traps at the heaters, as this insures quietness of action and positive circulation through the long runs of return piping.

Automatic temperature control is always desirable and economical in connection with systems of this kind. This may be accomplished by shutting off and turning on either the heater or the fan motor. The former method is usually preferable, as it leaves the fan free for operation during summer when heat is not needed, thus making it possible to improve the ventilation and make the buildings more comfortable during this portion of the year.

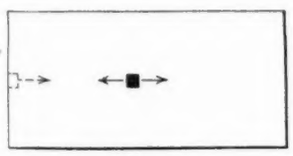


Fig. 3

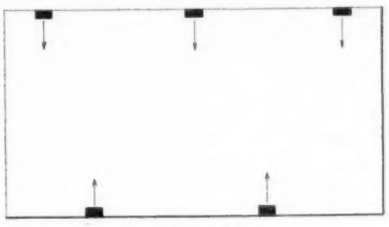


Fig. 3B

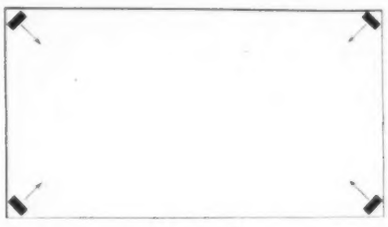


Fig. 3D

Fig. 3A

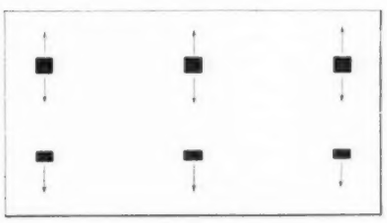


Fig. 3C

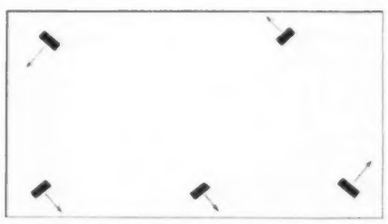


Fig. 3E

Arrangements of unit heaters for rooms of various sizes

THIS DEPARTMENT—

offers a new subject for discussion each month and gives readers' comments on problems introduced in previous issues. The subject opened in July is closed and a summary of contributed ideas is given on opposite page. Overseers and others are invited to discuss the subject presented under the heading "What to Do About a Second Shift" and other questions brought up in the super's talks. Letters accepted and published will be paid for without regard to length. Brevity is desirable.

Overseers'

WHAT TO DO ABOUT A

"I THINK we have a pretty tough chestnut to crack today," said Superintendent Chase as the overseers' meeting started. "I refer to the problem confronting a mill that can legitimately secure enough business to run the plant 60 hours per week. It would not be human nature for the management of such a plant to give up some business and only run one 40-hour shift and, on the other hand, trying desperately to secure enough business to run two full shifts would probably lead to cut-throat competition. With labor on a 40-hour-a-week basis, just how would you arrange things to operate machinery more than 40 or less than 80 hours per week?"

"I guess it's true that all mills won't be able to run an even 40- or 80-hour week," Bill spoke up, "and the way I'd handle the proposition would be to have one shift run 40 hours one week and then 20 hours the next. The second shift, of course, would run 20 hours the first week and 40 the second. In that way, everyone would have a crack at the long and the short shift and it would be fair to all. I certainly don't think it would be right to make one shift take short-time all the time."

"I'd fix it even simpler than that," Joe offered. "Why not just divide the work up evenly between two shifts? In other words, if the plant is to run 60 hours, each shift would be on the job 30 hours. If the plant operated 70 hours, each shift would have 35 hours."

▼

Fairest Basis for Wage Increase

Editor, Overseers' Round-Table:

Assuming that wages for each class of work in every department have been just and correct, the fairest basis for a wage increase is the flat percentage method. Where a sliding scale is found necessary it proves that the management admits that somewhere a just wage has not been paid. As the cost of living creates the necessity for the payment of wages, it follows that as prices advance a sufficient increase in wages is required to meet the situation. The government gives the rise in cost of living as a certain percentage, and it would seem that wages should be paid accordingly if the workers are to be happy and contented and able to meet the increased demand on their income.

A sliding scale of wage increases for the various types of workers is not conducive to harmony, as it may cause some employees to wonder why there should be any difference. Overseers, executives and superintendents should not be grouped with the workers in a pay increase as they usually receive much more. They should, however, be treated fairly, and here again an increase of a flat percentage should be used, even though it be a lower percentage than the one applying to the workers.

J. R.

Editor, Overseers' Round-Table:

Granted that a flat percentage increase in wages would be the best way to prevent friction, I, for one, do not believe that it is right and fair to apply this basis to every plant. Some highly skilled labor is greatly underpaid at present compared with semi-skilled and unskilled labor. I have in mind an actual case where a skilled job drew $20 a week before the depression and deserved it. Back in June the pay for the same work, on piece-rate, was $9 to $10, which is a reduction of 50%. Others in the same plant have been reduced only from 40% to 25% and now make about the same $10 per week.

To give everybody the same percentage increase would be grossly unfair to the skilled workers, who must spend at least 12 months to learn the job. Assuming that the correct wage is to be that of four years ago, the job that paid $20 per week before the depression should have the low rate increased 100%, while the less skilled, who only made an average of $13 in the old days, should be increased about 44%.

I am decidedly in favor of wage increases based on the particular job and the way the individual performs it—at the same time not forgetting the overseer.

B. Hooper.

Editor, Overseers' Round-Table:

The great percentage of mills put wages down by the percentage basis, and I advocate the raising of wages by the same basis.

Jealousy concerning wages of one department, in comparison with wages in another department, is ever present, but to advance some 5%, while others receive 15%, will certainly stir up more trouble.

Just at present the writer knows of several mills where the minimum wage code was put into effect and where those over the minimum wage were kept at the same wage. One need not ask as to how those receiving no increase in wages feel concerning that sliding scale increase which was from zero up to more than 50%.

E. S. Dunlap,
Dyer, Waynesboro Knitting Co.

Editor, Overseers' Round-Table:

After much thought and study of same, will say that I have arrived at the point where I believe that the fairest way to arrange a wage scale is to establish sound piece-rates in every department of the mill where they can be applied. Put hank clocks on the pickers, drawing frames, lap machines, combers, speeders, and spinning frames. Clocks can also be used on the slashers and pick counters on the looms. Doffers on spinning and twisting frames can doff by the hank. There are also machines in the cloth room that can be run with a clock. Help that cannot be paid on piece-rates should be paid according to the job.

With changes taking place so fast, the best thing is to have fair piece-rates as a basis wherever possible.

A. B. B.

Round-Table

SECOND SHIFT?

"The trouble with such plans," objected Pete, "is that none of the workers averages a full week's pay. I think the problem presents a fine chance to do some planning ahead. Suppose that by looking ahead a mill can decide that the plant will operate 60 hours a week for the next four months. The thing to do is to run two shifts for two of the months and a single shift the rest of the time. In this way the workers on the off shift would have a chance to pick up some work in other mills that might require some extra help just at that time. Different shifts would be released each time it was necessary to reduce to a single shift so that all would be treated fairly. If you can only give a man part time, make it so that he can use his spare time working elsewhere if he wants."

"You might carry it even further," Hank broke in. "If a company has several plants near each other, couldn't the workers be moved from one mill to another to let each run 60 hours? It might even be possible for manufacturers in one district to exchange workers. Thus a shift might work 40 hours in one plant one week and then 40 hours in another plant the next week."

► **How would *you* handle the dividing up the shifts in order to operate the plant 60 hours a week**

SUMMARY

THE FAIREST BASIS FOR A WAGE INCREASE. About 58% of the contributors stated that the fairest way to increase wages is to raise everyone—piece-rate workers included—on a flat percentage basis. The outstanding argument advanced by this group was that most cuts had been made on a percentage basis and that, furthermore, a flat percentage advance avoided jealousy and friction. The remaining 42% favored raising wages in accordance with individual conditions and what the job was worth. Advocates of this plan put forth their strongest argument in pointing out cases where decreases were decidedly not made on a percentage basis.

▼

Editor, Overseers' Round-Table:

The new minimum wage ruling has meant that many manufacturers have had to give an increase of 100% to their least skillful workers. A blanket increase of 100% would still only give a fair wage to the majority of productive textile labor; but such is probably too much to expect at this time.

Let us hope that employers are not going to keep the wages of the skilled workers down to make up for the increased rates they have had to give to their cheapest labor.

The only fair wage scale is that based on the comparative worth of the different operations and individuals. Now that a standard has been adopted for the lowest priced operatives, it should be a simple matter to figure upward from this rate for the more skillful workers. If quillers, banders-in, and pickers are paid $13 a week, then winders and enterers should get $16 to $18; weavers and warpers, $20 to $25 a week; fixers, $30 up, and overseers according to their worth. These figures are not what I would regard as a proper wage for textile workers, but they are perhaps as high as it is possible to pay under present conditions, and they can be increased as business improves.

W. F. P.

•

Machinery Salesmen In the Mill

Editor, Overseers' Round-Table:

Machinery and accessory salesmen cannot be regarded as disinterested consultants, in spite of the service they render, and ordinarily should be excluded from the mill. There is probably small risk of lost "secrets" to such visitors; the principal objection is the effect which strangers have on efficient routine. Unless workmen are used to incursions production may suffer.

Undeniably, there are occasions when a salesman and foreman, in company on the job, can exchange information profitably. Because of this, the rule excluding suppliers' representatives need not be a fast one. However, the visits are apt to benefit the foreman socially more than technically.

Ordinarily it is sufficient that the foreman and salesman meet, if the use of a product requires this kind of discussion. The meeting may be in the purchasing or superintendent's office. Such an arrangement maintains privacy in the mill, yet gives a salesman a fair chance to demonstrate his product to its actual user.

A. K.

•

Responsibility for Oiling Machinery

Editor, Overseers' Round-Table:

Line shafting and motors should be oiled by the mechanical department, but the oiling of departmental machinery should be taken care of by its respective operatives. The mechanical department knows best how motors and line shafting should be efficiently oiled.

Machines in different departments have their peculiarities and can be more efficiently oiled by the operatives. Oil holes often become filled with foreign matter and can be cleaned in spare moments. Hot bearings are caused by bearings being out of alignment sometimes. This can be remedied best by one who understands the machine. When you have many operatives constantly on the lookout for hot bearings and other lubrication troubles, machine care will be far better than in the hands of the mechanical department. It is a wise plan to consult the master mechanic about any problems that may arise in the lubrication of departmental machinery or to invite suggestions as to where better or more economical lubrication could be had with a new oil or grease.

"CARDER"

QUESTIONS AND ANSWERS

Care of Palmer Blankets

Technical Editor:

Will you kindly furnish me with information as to the proper methods of cleaning Palmer Blankets? (8012)

The following directions for the care of Palmer Blankets are taken from a bulletin put out recently by the Albany Felt Co., Albany, N. Y.

INSTALLATION—Install the blanket so that it will run in the direction of the arrow, which will be found near one selvage at the blue lines. Brush off all naphthalene that adheres to the blanket as soon as it starts to run. Be sure to brush always in the direction opposite to the arrow. It is important to keep the surface of the blanket clean while installing it. In order to prevent soiling, use clean papers on the floor to lay the blanket on, and use cloth covers over frame and dirty parts of the machine which the blanket might otherwise touch.

SPOTS AND DIRT—Remove occasional grease spots with carbon tetrachloride, using a cloth, and rubbing always in the direction opposite to the arrow. It is frequently advantageous to apply this treatment to the entire surface of the blanket. In this case we suggest a mixture of one part carbon tetrachloride, one part ethylene dichloride, and one part denatured alcohol.

SCORCHING—Scorching produces an injurious chemical action which deteriorates the fabric. This harmful effect can be decreased by cleaning the blanket every two weeks with a solution of 3% ammonia. This is made by diluting 2 qt. of commercial 26° ammonia with 5 gal. of cold water. Apply the solution with a cloth and rub in the direction opposite to the arrow. If possible, do this on a cold dryer and then run the blanket with the steam on until it is dry.

ROTTING—Although Palmer Blankets are injured by scorching, they are also injured by running too wet, which causes bacteriological growth or rotting. The blanket drying cylinder should be hot enough to dry the blanket but not hot enough to scorch it.

SHUTTING-DOWN—When shutting down the machine, turn off the steam and keep the blanket moving until the cylinders are cool. This will prevent scorching the blanket more in one place than another.

STORAGE—Blankets that are not in service should be stored in a room that is clean, cool, light, and dry, and should be tightly wrapped with paper. The package should contain a liberal amount of naphthalene flakes, moth balls, or other moth preventive, and if the package remains in storage more than three months a fresh supply of moth preventive should be added and distributed throughout the package. Never store Palmer Blankets against brick or concrete walls, nor against steam pipes.

WASHING—We recommend for this purpose the ammonia treatment prescribed for scorching. This should be given every week or ten days. We are informed that in the silk trade it is general practice to remove surface dirt and stains by washing

with a soap which is combined with a small amount of carbon-tetrachloride or a similar solvent.

▼

Woolen-Mule Clocks

Technical Editor:

The manufacture of cotton yarn seems to lend itself to the use of such devices as hank clocks for payroll purposes and seems, considering all factors, readily to permit paying piecework by revolutions of the delivery rolls. In the manufacture of woolen yarns on the mule, however, actual weighings seem to be the most practical way. Could such clocking devices be applied to advantage in a woolen yarn mill to determine piecework pay? (8032)

Piecework on woolen mule spinning is paid for in a great many mills by the clock. The clocks are graduated according to the number of draws of the carriage and the length of the draw. Many more mills pay only on the basis of actual weighings of the yarn. One well-known group of mills pays on the actual weighings, but checks by means of the clock.

▼

Unsatisfactory Silk Winding

Technical Editor:

We are inclosing three six-thread stockings with a bar or zebra-stripe effect, regarding which we ask your opinion. We do not use direct winding from the cone. We rewind our cones to bobbins over an emulsion on the winding machines. The emulsion consists of 3 pints Hydroleum and 1¼ lb. olive soap chips to 55 gal. soft water. On the knitting machines we use in the damp boxes 3 pints Hydroleum to 55 gal. of soft water. We keep the temperature at mill at 78° F. and the humidity at 60 to 63%.

In addition to this bar effect, we notice that the needles break in the panel or center of the stocking. This defect we did not notice prior to this new lot of silk.

We tried speeding the rollers on the winding machine to take more emulsion, but found this was worse. Then we tried slowing down the rollers, and found this a little better. This condition prevails on all machines without exception. (8038)

In our opinion, the trouble is due to uneven tension caused by the condition of the rewound silk on the bobbins. That is, it is probable that the outside surface of the bobbin dries out too rapidly. Since the silk runs off the full length of the traverse, it may have sufficient moisture except at a point where the first round or two at the base of traverse has had longer exposure to atmospheric conditions. This place may have dried sufficiently to have become sticky, thereby producing an uneven tension and causing one or more courses of tight knitting.

It is noticed that the stripes are close together at the top of the stocking and gradually get wider apart as the stocking narrows. This supports our opinion of uneven condition of the silk on the bobbin. At the widest part of the stocking more silk is necessary to make a course, and the two different parts of the silk are more quickly consumed. As the pattern narrows, less silk is consumed in making complete courses and the spaces get wider apart, with a more prominent tight-and-loose knitting condition. We are quite sure that the trouble can be found and eliminated at the bobbin winder.

We have seen similar conditions caused by uneven twist in silk, but the fact that your trouble exists on all machines seems to eliminate the possibility of uneven twist.

▼

Pin Stitches and Two-Tone

Technical Editor:

We have two problems confronting us down here on which I would like to have an opinion from you. The first problem is that of the co-called "pin stitches," or "strawberry stitches" as they are sometimes called. You will notice in the sample marked "A" that the welt and the heavy portion just below the double welts are full of the little enlarged stitches. What I would like to find out is the reason for this trouble and the remedy. In the sample marked "B" (and I have put aside a pair of these stockings) you will notice that the foot and leg are not matched properly. Our superintendent claims that this is due to different grades of silk and is really a denier difficulty. I should like to get your opinion on it. (7966)

Sample *A*, showing strawberry stitches, is a very well-balanced piece of knitting, and the machine is so nearly correctly adjusted that a slight change in the condition of the silk or in the adjustment of the machine should readily eliminate the trouble. This difficulty is purely a matter of distorted stitch construction, and can be produced by improperly conditioned silk, either too wet or too dry, and by improper adjustment of the actuating parts of the machine connected with the stitch control. Important among these adjustments are sinker and knocking-over-bit action, correct alignment of needles, and proper amount of take-up or ware-roller weights. You should first inspect the machines and see that the needles are in perfect alignment. Then check the catch-bar action. If these adjustments are found correct and head gages perfect, see if the knocking-over-bits would not stand a little more lift. With all of these different parts correctly adjusted and the trouble not eliminated, experiment with removing some of the take-up or ware-roller weight.

Reducing the problem to practical understanding, it is purely a matter of unbalanced stitch cast-off, which can be produced by too much stitch friction on the

QUESTIONS AND ANSWERS

needle on account of the silk being too wet or the stitches having so much take-up weight friction against the needles that they do slide perfectly in the cast-off. Or it may be a matter of the silk being too dry and producing unwieldy stitches.

Sample marked *B* shows such a wide variation in stitch construction between leg and foot that we believe the trouble to be an improper adjustment of machine, rather than uneven silk. If the silks of the two different parts were of different lots or of different denierage or filaments, the chances are there would be a much wider difference in color tone than is shown by the sample. And we believe that if the footer had been adjusted to the same courses per inch as the legger the trouble would not have developed.

It is not an easy matter to determine definitely whether silks are of different denierage or filament without some laboratory equipment and careful analysis of fabric. We would advise you to submit samples to the throwster or to some testing house to have a careful test made. This can be done without much trouble or expense. If your superintendent is knowingly producing legs from one lot of silk and feet from another, the practice should be abandoned. If you expect your superintendent to get uniform results from silk bought at random and without a careful follow-up of the different lots and natures of silk purchased, you are expecting entirely too much. Although we offer these suggestions, we believe that the trouble shown by exhibit B is in all probability purely one of knitting looser on the footer than on the legger.

▼

Weaving Necktie Lining

Technical Editor:

I am endeavoring to produce a necktie fabric on a narrow fabric loom, and am enclosing a sample showing the results obtained thus far. You will note that it has a certain amount of elasticity, but is not as soft, resilient, or resistant to creasing as are lining fabrics now in common use. I shall appreciate any suggestions which will assist me in obtaining a satisfactory product. I have seen an elastic bandage fabric which approximates the material I desire. (8010)

Elastic bandage is usually constructed with a warp of 26/2 cotton yarn having about 42 turns per inch, the alternate ends being left and right twist. The filling is generally a regular 10/1 cotton yarn. After weaving, the material is subjected to the action of boiling water (to which a small amount of soap has been added), for about ½ hr. The amount of shrinkage is governed to a considerable extent by the number of woven picks per inch; the less the number of woven picks per inch (within reason), the greater the fabric will be permitted to shrink. With the foregoing construction, 18 picks per inch is quite common, and the amount of shrinkage is approximately 50%. The plain or 1/1 weave is usually employed.

The sample submitted has far too many

picks (28), and the reed used (probably a 12 dent) is far too coarse. Two ends per dent in the reed would be better for this fabric, and a much lighter filling tension would be advisable. The lighter filling tension will result in a thinner edge. If a product of exceptional quality is desired, we recommend shaping the material in the process of weaving by the use of a fan reed. Thus the material would be woven narrow for the neck section, and wide for the flare.

It occurs to us that a suitable fabric might be manufactured on a braider, thereby effecting the diagonal interlacing; and it may be possible to shape the braided product.

▼

Small Half-Hose Mill

Technical Editor:

The question and answer on "Requirements for Small Knitting Plant" in your March issue attracted my attention. It is evident from the nature of the question that the inquirer is not a practical hosiery man. Small plants cannot usually be profitably started by men who are not familiar with the business. They must at once hire a capable man able to service all the machines and even to manage the finishing department. Since, in late years, employees have usually specialized in certain departments of the work, men with all-round experience are difficult to find, although there are plenty of adjusters available for knitters, ribbers, loopers, sewing machines, and the boarding and other finishing equipment. Unless the mill is located in a hosiery center, consideration must be given to the expense of training help, an item sometimes not properly allowed for.

With respect to the equipment required, it is necessary to have a well-balanced plant. For a transfer-top half hose it will be necessary to have one rib-top machine to every five knitters. Each ribber, if properly operated, should produce 25 doz. tops daily. An output of 5 doz. 176-needle or finer hose per knitter is a good production. One looper should also take care of five knitters, and an exceptionally good operator will do better, especially with a trimmer attachment. For a mill of small or medium size, it is most economical and satisfactory to have the dyeing done by a custom dyeing plant. The writer has found it desirable to install a set of standard permanent-size drying forms, as these insure a symmetrical stocking. Due to the fact that the small sizes of hosiery do not have quite as long legs (that is, from heel to rib top) as the larger sizes, these forms prevent distorting the rib tops on the smaller hose. The finishing department will also require several tables with perfectly smooth tops, bins for the different sizes, and the necessary trademarking or stamping materials.

CHARLES N. MORRIS.

Penalizing Wool Weaver

Technical Editor:

What is the current practice regarding fines for defective workmanship in the weaving of woolens? Where operators are fined for defective workmanship, how are they fined and how much or how many minutes per fine? We have in mind weavers working on incentive. Some of the bad work we are considering includes broken picks, long ends out, floats, missed picks, wrong start, and wrong draw. (8031)

In many states it is unlawful to penalize for defective workmanship. However, for the control of quality in the case of piecework operators, some such plan is necessary. This is especially true in the weaving, not only because it is the most expensive operation in woolen manufacture, but because it is the source of seconds which are costly to repair. The current practice is to allow a certain number of flaws in a piece of first quality, but all are marked by the percher to be repaired later in the sewing department. A first-quality cut often gets a standard price plus a 10% bonus. Generally a piece will be marked second quality if it contains over five broken or missed picks, several floats, a wrong draw over 3 yd. long, or some combination of these defects. While a definite penalty could be assigned to each defect, we believe that the extra clerical work is not justified. In this bonus plan the weaver is expected always to make the bonus in the same sense that the weaver is expected *not* to be fined where a penalty system is used. Whenever the percher thinks a piece is not up to standard, he may get the weaver and the boss weaver to look it over together.

▼

Cotton-Rayon Nub Yarn

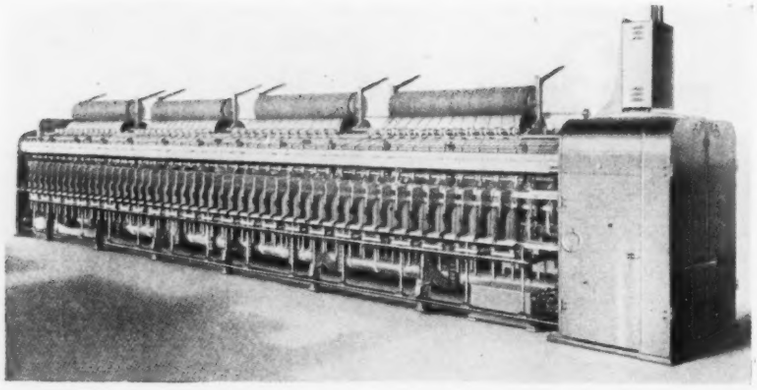
Technical Editor:

We are trying to cop and weave a combination cotton and rayon nub (or knob) yarn. The nubs are 8 in. apart and are 1/16 in. in diameter. The yarn is twisted right hand. What is the procedure in the quilling and copping departments? In the weaving we feel we have the right shuttle, but a few pointers here will do no harm. Our ordinary shuttle is 15/16×1×8 in. inside. (8033)

There should be no difficulty in the quilling or winding on bobbins of the nub yarn as in the sample you have supplied. However, the nub is not very well tied in, and the less the yarn is handled, the less the liability of the nub unraveling.

When quilling or winding on shuttle bobbins, very little tension should be used; and this means less than the usual yardage of yarn on a quill or bobbin. Very little tension should be used inside the shuttle. Whatever the tension used, it should be located on the sides of the shuttle. No tension should be used near the eye because of the danger of the filling unraveling or breaking. On account of the small amount of tension during the quilling or winding, only a small yardage can be wound on quill or bobbin, and we advise the use of a larger shuttle. The shuttle which you are using is much too small for the weaving of a large nub filling.

NEW MACHINERY



Woolen Ring Spinning Frame

WHITIN Machine Works, Whitinsville, Mass., recently announced the Model "E" wool spinning frame of entirely new design, having several features not available in previous models, and making possible the economies of larger package spinning. The head end is of the box type, self-contained, and houses not only the complete motor drive, which incorporates a simplified clutch for easy starting, but also all working mechanisms, including all drives with the exception of the spool drum drive which is located at the foot end of the frame. The head has been designed with an integral drip pan which retains any excess grease and oil. All bearings in the enclosed head, with the exception of ball bearings, are oiled by one-shot lubrication system.

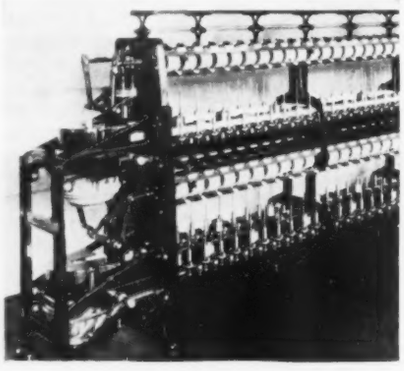
Another major improvement is an entirely new type of spindle drive said to permit perfect balance of the spindle rails, which are so constructed, according to the makers, that there is no danger of the lifter rods binding in the bushings at any time, and an easy, smooth traverse of the spindle throughout the build of the bobbin is assured. Counterbalancing of the spindle rails is provided for through the medium of a square shaft extending the entire length of the frame. Aeroplane flexible cables are used to suspend the cradle bars to the sheaves on the square shafts. The traversing mechanism is so arranged that the travel of the front roll varies constantly within a cycle that is completed only once in several thousand traverses, thus making possible much longer life of the steel rolls and also the covered top rolls.

Instead of the ordinary single line of metallic drawing rolls, in this machine a double line of drawing rolls in combination with single weighted top roll has been made available in order to permit additional gripping of the yarn on fine counts. The single line compression roll may be removed by pushing against the pad of the weight lever which projects below the front roll, allowing the compression roll to drop into the hand. The builder motion assembly has combined with it an ingenious automatic wind-back mechanism which may be readily adjusted to any length of traverse, so that, when the bobbins are filled, the motion will automatically wind the spindle rails back to the starting position and stop the frame, ready for doffing. The builder mechanism has two distinct speeds: a low forward speed while building the package, and a high reversing speed for winding back the rails. A hand wind-back arrangement is also provided for use in running small lots.

Built into the frame, and available when desired, is a variable-speed-drive mechanism which automatically controls the speed of the frame from the beginning to the end of the doff. In order to keep high-speed frames in more constant operation, according to the manufacturer, the tendency has been to reduce the number of spindles to avoid long stops for doffing and creeling. Lengths vary from 80 to 120 spindles per frame, and it is said that in many cases shortening of the frame has increased efficiency as high as 90%. The new frame is about 10 in. narrower than previous models, thus affording further saving in floor space.

Twister For Silk and Rayon

FOR high speed twisting of silk and rayon, the U. S. Textile Machine Co., Scranton, Pa., has developed the new "Acme" twister of double-deck construction. Features of this new machine include anti-friction bearings, closed end frames, large oil reservoir spindle socket, and traverse mechanism with self-lubricating cams and roller. All gears are in fixed position for quick change and so designed as to change the ratio and not center distance from tram to crepe twist. Ball bearings are used in the roller shafts, traverse mechanism and twist gear bearings. All twist gears are mounted outside of frame on bracket which can swing opposite twist as desired from one to 80 turns. Each deck can be operated separately and, because one deck is offset more than the other, greater visibility is provided for locating broken ends. The drive consists of an individual 2 hp. motor for each deck, mounted on slide controlled by rack-gear and weight which is said to deliver a uniform tension assuring smooth and even speed. The spindle belt controls take-up rolls and is replaced endless. The manufacturers claim that the two-motor application operates with a high power factor and that carefully conducted tests have proved that the twister has low power consumption. It is said that the machine produces yarn practically free from oil and dirt contamination.

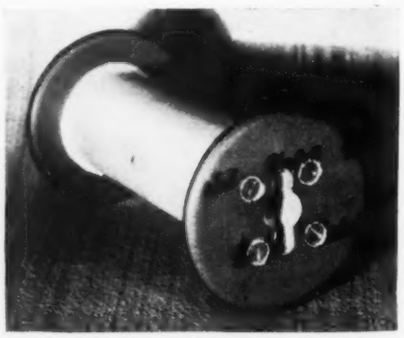


Compounded Rubber Pot Eyes

MANHATTAN Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., has announced the development of a special compounded rubber material, known as "Parock," for use in the manufacture of pot eyes. This material takes a high polish and pot eyes made of "Parock" are said to wear indefinitely, do not oxidize or deteriorate due to age, nor are they affected by dyeing and bleaching solutions. Pot eyes are tan color and available in sizes from 2½-in. to 15-in. in diameter.

Bakelite-Head Bobbin

A COMBINATION paper and fabric Bakelite laminated bobbin head has been devised by Merkel Bobbin Co., Allentown, Pa. The inside half of the head is produced from a paper base, providing smoothness. The outside half is processed from cotton duck, providing a high degree of impact resistance. The heads are produced for Merkel by Synthane Corp., Oaks, Pa.



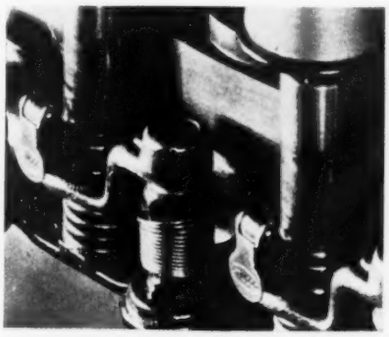
Pick Counter Stamping

A PICK counter known as the Textograph and equipped with stamping mechanism has been placed on the market by the Dehler-Signoret Corp., 698 Metropolitan Ave., Brooklyn, N. Y. The stamping is done by means of a small inked ribbon stretched across a frame which can be changed by hand without the counting mechanism having to be opened. Each counter has a distinguishing number in the stamping mechanism, which is printed on the card

whenever it is stamped. The back of the card is arranged as a so-called time calculator and enables the start and finish of each piece to be recorded, as well as any interruption caused by defects, warp changes, etc. While the front of the card depends on the construction of the counter and reports only pickage, the back of the card can be arranged for the individual requirements of the mill.

Uni-Twist Belting

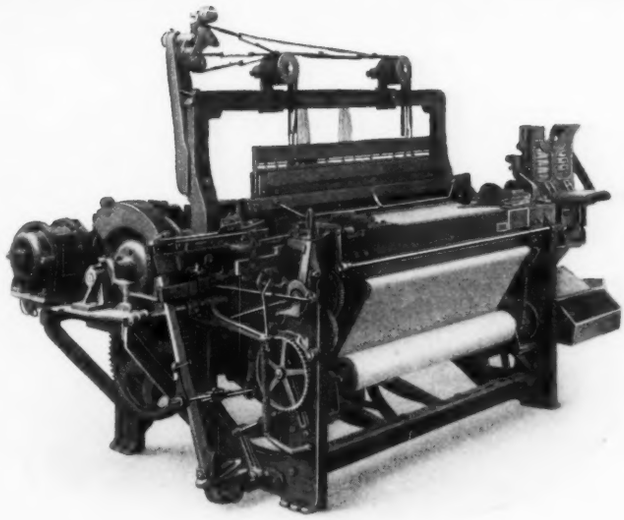
ATWOOD Machine Co., Stonington, Conn., recently announced its "Uni-Twist" belting for twisting and throwing equipment. These belts are said to run with minimum vibration, to be practically



free from stretch, and uniform in thickness from end to end. Because of the high pulley grip, it is said, they are run with less tension than ordinary belts, thus effecting savings in power and relieving the load on bearings. These belts are supplied lapless and endless, which means that they consist of a single length of fabric many times the length of the belt but wound around like a bandage and cemented together into a single integral unit belt. It is claimed that difficulties from lapping are entirely eliminated. These belts, which are made of a strong, tightly-woven fabric, are furnished in lengths to suit the various machines. Lapless, endless "Unit-Twist" belting is recommended for "Monarch" twisters, while the "Uni-Twist" belting is recommended for other types of Atwood twisters.

Two-Speed Rotary Size Pump

SACO-LOWELL Shops, Boston, have developed a two-speed rotary size pump which differs from previous standard pumps in that it has, instead of the usual tight and loose pulleys, still a third pulley, and a small gear train which includes a ratchet and pawl mechanism. Running on slow speed during most of the day, the pump is driven through this extra train of gears. When the higher speed is desired, the belt is shifted to the other pulley, and the pump is driven directly as in the usual single-speed pump. The pawl and ratchet mechanism allows the gear train to drive loosely. This arrangement to permit slow speed operation is said to reduce the need for repairs and thus save time lost by repair work, such as the replacement of pump packing, and brass sleeves on the rotor shaft.



Rayon Loom

BECAUSE in weaving rayon it is important to start and stop the shuttle with as little shock as possible, the new "C Model" rayon loom developed by Draper Corp., Hopedale, Mass., is without daggers or frogs. To permit slowing down the shuttle and yet prevent smashes, a "loose" reed is provided which is loose if the shuttle is trapped but is positively held during the regular time of the shuttle flight and at the beat-up.

The loom is a shuttle-changer and lays the first pick after a filling change with the same even tension as other picks. The shuttle is changed during the fraction of a second that the shuttle is in the box, without disturbing the operation or any other motion of the loom. The changing device is simple and quiet and is claimed to operate dependably and without marring the shuttle.

The take-up is designed to cover the whole range of rayon weaves and operate with the exactness necessary to prevent inequalities; and a new double-impulse let-off assists and sustains this accuracy. A device automatically disengages the take-up pawl when the loom stops, to prevent starting marks that come from turning the loom over by hand. A let-off release lever enables the weaver to take the tension off the warp for the over-night or week-end stop. This is important for rayon. The temple has a pod that sets at a new angle to the cloth. The thread cutter operates only three times at the shuttle change; then it is drawn back out of the way. The internal expanding brake and certain other features of the new "X Model" cotton loom have been applied to the "C Model."

Preventing Rust in Machine Conditioning

FOR the purpose of preventing rust formation on bobbin rings in conditioning cotton yarn in machines, Borne Scrymser Co., New York, has developed a product, known as "Meon," which is said to overcome this trouble and also to protect the metal parts of conditioning machines. One gallon of this product is generally added to 99 gal. of water, providing sufficient liquid for conditioning about 15,000 lb. of filling yarn.

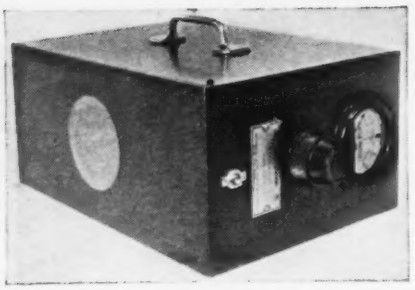
Greaseless Bar Traveler

ELIMINATION of grease on the spinning ring, uniform twist and a reduction of wear on the ring and traveler are among the advantages claimed for the Schaaff greaseless bar traveler and spinning ring which is manufactured and sold in this country by L. M. Hartson Co., North Windham, Conn. Greater uniformity of twist is said to be obtained where the ring traveler is used by elimination of

the kink in the yarn at the point where it passes through the pig-tail into the take-up spool. Another advantage is said to be the elimination of lubrication stains.

Photo-Electric Color Matcher

FOR matching colors scientifically, The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed a photo-electric color matcher that is portable and may be used in any position. The device is so arranged that samples can be compared at three points of the visible spectrum indicating whether two samples are matched. It does not, however, analyze samples into the respective constituents. It is claimed that either light or dark samples may be tested, the sensitivity of the unit allowing the matching of even very black surfaces. Condition of the surface, dull or bright, is said not to affect the color matcher. A rectifier tube and filter circuit provide plate and grid voltages for



the matching circuit. The matching circuit consists of a low grid current amplifier tube, photo-tube, coupling circuit and sensitivity control. The optical system is independent of daylight or external artificial light. A three position color screen is said to permit comparison between the sample and a standard in each of three bands of the spectrum: blue, green and red.

Jack Cut Presser

TO reduce the cost and inconvenience involved in producing a large variety of designs on spring-needle circular knitting machines by means of cut pressers, Tompkins Bros. Co. developed a short time ago a presser with removable jacks requiring no cutting. This device has lately been developed to a point where it permits fast and inexpensive pattern changes. The jacks may now be removed or inserted at will without any necessity for the presser being removed from the machine. Each jack is individually given a V-shaped notch on the edge to insure proper contact with the needle. The wheel is fitted

to a shoe or flat presser to keep the needle beards closed between stitch wheel and press-off point, thus preventing drop stitches. The pressers are made with any number of cuts and in all gages.

General Equipment

ALSO of interest to the textile field are the following improvements in general industrial equipment:

Water Hardness Tester. Elgin Softener Corp., Elgin, Ill. An automatic instrument, utilizing the photo-electric cell, which tests the water produced by a Zeolite water softener and sounds an alarm when the hardness exceeds any predetermined figure. The instrument is also used to check the brine wash-water so that the softener will not be used until all brine is removed.

Abrasives. Amour Sand Paper Works, Chicago, Ill.; Behr-Manning Corp., Troy, N. Y.; Carborundum Co., Niagara Falls, N. Y.; and Minnesota Mining & Mfg. Co., St. Paul, Minn. Improved type of sandpaper manufactured by electrocoating process said to spread all abrasive particles evenly over the backing and to imbed them with the cutting edges upward.

Vertical Propulsion Strainer. Rotospray Mfg. Co., 562 W. Washington Blvd., Chicago. Circular vertical screen permits suspended material to drop off. Motor-driven diaphragm propels material. Suitable for gum arabic.

Oils and Greases. E. F. Houghton & Co., Philadelphia. "Sta-Put" lubricants with high film strength, lubricity, and adhesiveness gained by special polymerization of original mineral oil.

Preparing for 1934 Southern Textile Show

Textile Hall Corp., Greenville, S. C., has just issued the prospectus for the Eleventh Southern Textile Exposition to be held in Greenville, Oct. 15 to 20, 1934. The rules of the exposition are given and it is stated that regular exhibitors will be given positions usually occupied if desired where such allotments are practicable under the 1934 diagram. William G. Sirrine is president of the Textile Hall Corp.

•

To Discuss Accident Control

Progress in the control of accidents and the steps necessary to increase the safety of textile-mill operations will be discussed by the Textile Section of the National Safety Council during the 22nd Annual Safety Congress and Exposition to be held at the Stevens Hotel, Chicago, Oct. 2 to 6. Charles H. Eames, president of Lowell Textile Institute, will preside. Speakers will include J. T. Trolinger, of American Bemberg Corp. and American Glanzstoff Corp.

•

Acquires Textile Banking Co.

Announcement was made Sept. 5 that the Commercial Credit Co., Baltimore, has made an offer to all stockholders of the Textile Banking Co., New York, for the entire capital stock of the latter company at $50 cash per share for delivery on or after Sept. 30 but not later than Oct. 24—upon which basis more than two-thirds of the capital stock had already been acquired at the time of announcement.

This change in stock ownership will in no way affect either the present management or its relations with its customers for whom it acts as factors. There will be no change in the officers or board of directors other than the addition to the board of A. E. Duncan and H. L. Wynegar, who are chairman and president, respectively, of the Commercial Credit Co.

Textile Banking Co. was organized in 1919 and is the second largest factoring concern. Its business for 1933 should exceed $70,000,000 and its estimated net earnings for the year are in excess of $500,000 which will be the most profitable year in its history.

Commercial Credit Co. has been in existence 21 years and has become one of the three largest companies which finance current receivables covering the sale of merchandise, especially automobiles and other articles, sold on the installment plan.

•

Used Machinery Dealers Meet

An informal meeting of dealers in used textile machinery and equipment was held in New York, Aug. 31. It was the feeling of the meeting that it would be advantageous for the group to develop a code to cover its business. Similar informal meetings were scheduled to be held among the New England group and the Southern group. A further meeting was called for Sept. 14 in New York. A. J. Matthes is chairman of a temporary committee formed by the New York group.

•

Columbia Textile Courses

Three evening courses in textiles are to be given by Columbia University, New York, commencing on Sept. 28, each course including one lecture a week from 7:30 to 9:20 p.m. for fifteen weeks. Cotton spinning and weaving lectures, by H. R. Mauersberger, textile consultant, New York, will be given Fridays; lectures on the manufacture and converting of rayon yarns and goods, also by Mr. Mauersberger, on Thursdays; and textile-design lectures, including woven and printed work, by William Arlt, commercial designer, New York, also on Fridays.

•

Courses at N. Y. Evening High School

The Evening Textile High and Trade School, New York, offers, free of charge, courses in cotton, wool, silk, rayon, cloth analysis, textile testing, cotton manufacture, experimental dyeing, textile chemistry, applied textile design, window dressing, salesmanship and merchandising, operating knitting machines, textile printing, garment designing, weaving and loom, etc. A special advanced course is offered leading to a State Regent's Textile Diploma.

•

Extension Course in Microscopy at M.I.T.

Prof. E. R. Schwartz of M.I.T. will conduct a course in "Textile Analysis and Microscopy" under the State Dept. of Education's University Extension Division in Building No. 3, of the Massachusetts Institute of Technology, Cambridge, beginning Wednesday, Nov. 22 at 7 p.m. and including eight weekly lectures and demonstrations.

Textile Calendar

Carolina Yarn Association, Annual Golf Tournament and Outing, Roaring Gap, N. C., Sept. 15 and 16, 1933.

Fourteenth Exposition of Chemical Industries, Grand Central Palace, New York, Dec. 4 to 9, 1933.

Silk Assn. of America, Annual Dinner, Waldorf-Astoria, New York, Jan. 18, 1934.

Southern Textile Exposition, Eleventh Annual Exhibit, Textile Hall, Greenville, S. C., Oct. 15 to 20, 1934.

THE PERSONAL PAGE

Joseph **Hacker** has been elected president of the Imperial Knitting Co., Milwaukee, Wis., to succeed **R. A. Schoenfeld** who resigned. Mr. Hacker was formerly vice-president.

Herbert **S. Morrow,** vice-president of Joseph Bancroft & Sons Co., New York, and previous to 1932 with the U. S. Finishing Co., will become associated with H. Nelson Slater in Washington in connection with NRA.

Frederick A. Williams, *elected president of Cannon Mills, Inc., New York, selling agents for Cannon Mills Co. and other Southern mills. Mr. Williams has been with Cannon Mills since* 1906, *when he began as a bookkeeper. He succeeds* **Charles A. Cannon** *as president but the latter will serve as chairman of the board.*

Felix **Lowy,** formerly vice-president in charge of sales for Colgate-Palmolive-Peet Co., Chicago, Ill., has been elected vice-president and general manager of the Holeproof Hosiery Co., Milwaukee, Wis.

Arthur **A. Murphy,** formerly vice-president in charge of sales of the Industrial Rayon Co., has accepted a similar position with the Synthetic Plastics Co.

M. **B. Leath** has resigned as vice-president and assistant treasurer, Hannah Pickett Mills, Rockingham, N. C., to study law at the University of North Carolina. He has been succeeded as assistant treasurer by **Alex S. Monroe.**

Thomas **Bancroft** has been elected a vice-president of the Gossett Mills and of the Chadwick Hoskins Co. and a director of Turner, Halsey Co.

W. **L. O'Brien, Jr.,** formerly treasurer of the O'Brien Hosiery Mills Co., Winston-Salem, N. C., has been appointed as rayon expert with the Agricultural Adjustment Administration.

Frederick **H. Knight,** for the last seven years secretary-treasurer and a director of the Susquehanna Silk Mills and its several subsidiaries, has resigned.

E. **C. Gwaltney** has resigned as vice-president and general manager of the Morgan Cotton Mills, Inc., Laurel Hill, N. C., to accept a position with the Bibb Mfg. Co., Macon, Ga.

W. **D. Massey,** formerly superintendent of the Peerless Cotton Mills, Thomaston, Ga., has been transferred to the Griffin (Ga.) Mills, Inc., in the same capacity, succeeding **Floyd B. Watson.** Robert **J. Adams** has been promoted to superintendent, Peerless Cotton Mills.

L. **W. Evans,** formerly overseer of carding and spinning, Springfield plant of the Morgan Cotton Mills, Inc., Laurel Hill, N. C., has been promoted to superintendent of the Richmond plant of the same company. He succeeds **M. B. Boseman** who has been transferred to the Quitman (Ga.) plant.

Robert L. Stevens president of J. P. Stevens & Co., New York, has returned from Washington where he had served as chairman of the policy board of NRA. He is succeeded by **Robert K. Straus.**

Curran E. Easley has resigned as chief engineer, Callaway Mills, LaGrange, Ga., and gone into business at Greenville, S. C., as manufacturers agent handling mechanical equipment.

Robert A. Morgan, who is associated with The Textile Development Co., Greensboro, N. C., and Boston, Mass., has been appointed general manager of the Cedartown (Ga.) Cotton and Export Co., succeeding **Charles R. Brumby.**

Francis J. McNeice has accepted the position as overseer of dyeing at the Broadalbin (N. Y.) Knitting Mills.

Ernest Moore, formerly designer and cost engineer with the Spencer Corp., Spindale, N. C., is now connected with Dover Mills Co., Shelby, N. C.

W. D. Jenkins is now superintendent of Oconee Textiles, Inc., Westminster, S. C.

Lester Iutzi, formerly a supervisor in the mills of the La Textiles Ltd., Woodstock, Ont., has been appointed superintendent of Avalon Fabrics Ltd., Stratford, Ont.

F. J. Witham has been promoted to the position of superintendent at the Edwards Mfg. Co., Augusta, Me., where he was formerly overseer of weaving, dressing, drawing, spooling, and warping. **John J. Henchy** has been advanced to overseer of weaving. **Arthur Booth,** a second hand, has been made overseer of spooling, warping, dressing and drawing.

Alex S. Monroe has been named assistant treasurer of the Hannah-Pickett Cotton Mills, Rockingham, N. C.

Carl M. Moore, formerly assistant superintendent, Piedmont (S .C.) Mfg. Co., has been promoted to superintendent, succeeding the late **S. T. Buchanan.**

Allie H. Holt, who graduated from the Textile School of North Carolina State College in June, is now foreman of beam dyeing for the Roanoke Mills Co., Roanoke Rapids, N. C.

H. R. Hart, who has been superintendent of Aiken Mills, Inc., Bath, S. C., has been promoted to general superintendent of the company's plants at Langley, Bath and Clearwater, S. C.

J. P. Hughes has been promoted to superintendent of the Eno Cotton Mills, Hillsboro, N. C., succeeding **C. H. Robertson,** who was recently appointed Collector of Internal Revenue for North Carolina.

R. G. Wood is now superintendent of the Gray plant of Textiles-Incorporated, Gastonia, N. C.

Thomas J. Shea has become associated with Scheuer & Co., cloth brokers and consultants, New York. He will specialize in the development and merchandising of rayon fabrics.

J. L. Getchell, of Hartland, Me., was elected president of the Woolen Mill Overseers' Association of Eastern Maine at the 37th annual meeting and field day of the organization at the Elms, Newport, Me. Other officers chosen were: vice-president, **L. E. Mellor,** Guilford; secretary, **Lewis B. Sands,** Newport.

Nathan P. Jollie of the Cone Export & Commission Co. recently completed a half a century in the textile business. Mr. Jollie has been with only two concerns in the entire time, Bliss, Fabyan & Co., and Cone Export & Commission Co.

Sam Hass, *head of the woolen goods firm of J. K. & L. S. Weiner & Co., who completed* 50 *years in the business last month. In* 1883 *Mr. Hass, then* 15, *entered the employ of L. Hass & Co. at* $2.50 *per week.*

•

Obituary

Walter Lee Nicholson, aged 64, treasurer and general manager, Globe Mills, Inc., Mount Holly, N. C., died at his home in Charlotte, N. C., Aug. 29.

James F. Cable, aged 55, recently resigned as general manager of the Hamilton Woolen Co., Southbridge, Mass., because of ill health, died at his home in Southbridge on Aug. 5.

Horace L. Smith, aged 72, vice-president and treasurer, Mt. Vernon-Woodberry Mills, Inc., Baltimore, Md., died at his home there, Aug. 27.

Henry Wells, Sr., aged 58, president of the Warwick Print Works, Bound Brook, N. J., died at his home in Elizabeth on Aug. 24.

J. Albert Sherrill, aged 81, organizer and for many years president of the Mooresville (N. C.) Cotton Mills, died at his home in Mooresville, Aug. 22.

Edgar Stanton Tichenor, aged 75, president of Walton Cotton Mills, Monroe, Ga., died Aug. 3.

John M. Cannon, aged 65, superintendent, Easley (S. C.) Cotton Mills, died at his home, Aug. 28. He had been superintendent of F. W. Poe Mfg. Co., Greenville, S. C., Woodside Cotton Mills Co., Fountain Inn and Simpsonville, S. C., before going to Easley.

George E. McLean, vice-president of Andrew McLean Co. and president of T. R. Goodlatte & Sons, Delawanna, N. J., was drowned while endeavoring to rescue a companion near Point Pleasant, N. J.

NEW PUBLICATIONS

THE TEXTILES STUDENT'S MANUAL; by T. Welford; Pitman Publishing Corp., New York; 221 pages; $2.25.

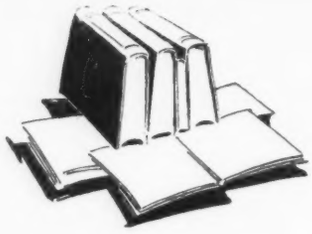
This "outline of all textile processes, from the origin of the fiber to the finished cloth" is by a "lecturer on textiles to the London County Council," England. It is frankly an elementary treatise expressed in non-technical language for the student or textile novice, but it is about as extensive a picture of textile-manufacturing technic as can be compressed into a small volume.

DIRECTORY OF COMMERCIAL TEXTILE TESTING LABORATORIES; Textile Foundation, Washington, D. C. Free on request.

This directory, which fills an important need in the textile industry, contains a list of 63 commercial testing laboratories doing textile work and a list of 25 educational laboratories which undertake such work on a commercial basis, including the laboratories of various textile schools and colleges.

AMERICAN COTTON MANUFACTURERS ASSOCIATION, BOOK OF PROCEEDINGS; W. M. McLaurine, Secretary-Treasurer, First National Building, Charlotte, N. C.; 150 pages.

Bound in fabrikoid, this annual publication of the A.M.C.A. contains biographical sketch of T. M. Marchant, president of the association, and complete proceedings of the 37th annual convention held at Pinehurst, N. C. There is an appendix including the code of fair competition adopted for the industry.



Business Literature

Art of Buying. Steel Heddle Mfg. Co., Philadelphia. Company to reprint, in book form, when completed, series of advertisements on art of buying, now appearing in textile publications under caption "The Buyer's Column." Requests for reservations of copies now being received.

Modernization. Farrel-Birmingham Co., Inc., Ansonia, Conn. Booklet-editorial entitled "A Key to Industrial Recovery" which is intended to prove the economic justification for mechanization of industry.

Labor Efficiency. Emmons Loom Harness Co., Lawrence, Mass. Booklet entitled "If I Were a Worker——" written in the language of the average mill worker to emphasize labor's part of the industrial recovery program in cotton mills.

Preparatory Processes. Saco-Lowell Shops, Boston. May-June issue of the *Saco-Lowell Bulletin* containing descriptions of a synchronized blending, feeding and distributing system, a new picker change-over, and a new compound for roving frames.

Welding. The Linde Air Products Co., New York. August issue of *Oxy-Acetylene Tips* describing methods of reclaiming expansion reamers and showing four new cutting machines.

Painting Gun. Eclipse Air Brush Co., Inc. Improved air brush for all types of spray painting, features including greater capacity, adjustable trigger tension, and low pressure operation.

Rubber-Lined Valve. B. F. Goodrich Rubber Co., Akron, Ohio, rubber-lined valve, designed to withstand working pressures up to 150 lb. per sq.in., handling corrosive and abrasive fluids. Featured by simplicity of design.

Knitting Machines. Louis Hirsch Textile Machines, Inc., New York. Two booklets describing the "single-unit" full-fashioned hosiery knitting machines manufactured by Karl Lieberknecht.

Photomicrography. Bausch and Lomb Optical Co., Rochester, N. Y. Illustrated booklet on low power photomicrography with the "Micro-Tessar" lenses.

Sewing Machines. Union Special Machine Co., Chicago. August issue of *The Needle's Eye* containing description of the company's display in connection with the Century of Progress Exposition and miscellaneous information on new models of sewing machines.

Wool Spinning. Whitin Machine Works, Whitinsville, Mass. Illustrated booklet showing the design and essential data for the continuous wool spinning frame.

Motors. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Illustrated leaflet on Type "G" high speed synchronous motors with thermo-guard protection.

Feed Water Regulator. Northern Equipment Co., Erie, Pa. Illustrated bulletin showing design and operation of the "Copes" double control regulator.

Roller Bearings. Hyatt Roller Bearing Co., Newark, N. J. Illustrated folder showing applications of roller bearings to drawing, spinning, and twisting frames.

Finishing Machinery. James Hunter Machine Co., North Adams, Mass. July issue of *The Hunter Counselor* containing article on scientific control of wool scouring.

BUSINESS NEWS

American Laundry Machinery Co., Cincinnati, Ohio, which for 50 years has sold specialized equipment to the textile industry, has organized a separate subsidiary company to concentrate upon serving this field and further expanding the business. This new company is the Rochester Engineering & Centrifugal Corp., with executive offices at 110 Buffalo Road, Rochester, N. Y. Officers are: president and treasurer, V. C. Kreuter; vice-president and secretary, Taylor Stanley; general sales manager, R. C. Caine. Messrs. Kreuter and Stanley have been with the parent company for many years and Mr. Caine has a similarly long record of service as sales manager of the specialty department of American Laundry Machinery Co., which was the branch devoted to the textile field.

Willcox & Gibbs Sewing Machine Co., has instituted an interesting form of co-operative advertising by turning over to nationally known manufacturers of textile products who use W. & G. machines, display windows in its New York, Newark and Chicago offices. The windows are turned over to the manufacturer for a period of two weeks each year without charge, and the decoration centers around one W. & G. machine of the type used in fabricating the products displayed. Those who have already had window displays or who are scheduled for the near future include Cluett, Peabody & Co., Cannon Mills, John B. Stetson Co., Munsingwear Corp., William Carter Co., Pacific Mills, Sweet-Orr, Inc., and Steiner-Liberty Corp. Cluett-Peabody officials, who have already utilized the windows, express belief that their company derived considerable benefit from the display.

Lewis-Shepard Co., Boston, Mass., has appointed George H. Corliss sales promotion and advertising manager to merchandise its line of factory and warehouse material handling equipment.

Combustion Engineering Co., Inc., New York, a newly organized company, took over the properties of International Combustion Engineering Corp. and affiliated companies recently sold by order of the Federal Court. The properties acquired include those of Combustion Engineering Corp., Hedges-Walsh-Weidner Co., Coshocton Iron Co. and Raymond Bros. Impact Pulverized Co. These properties will be operated under a single centralized management.

American Tool & Machine Co., Boston, has retained T. A. Bryson as consulting engineer. Mr. Bryson has been identified for many years with the design, construction and application of centrifugal separators in the process industries.

Kron Co., Bridgeport, Conn., industrial scales, has appointed R. S. Kerr & Co., Atlanta, Ga., as a distributor for its complete line.

General Electric Co. and four of its associated companies have removed their New York offices from 120 Broadway to the new General Electric Building at 570 Lexington Ave., at 51st Street. About 50% of the new 50-story building is occupied by the company. The service building of the company is located at 414 West 13th Street.

Yale & Towne Mfg. Co., New York, have purchased the businesses of the Walker Vehicle Co. and the Automatic Transportation Co., both of Chicago, makers of electric trucks and electric street vehicles. The manufacture and sale of the products of each company will be continued under the present personnel with F. H. Tinsley in charge. The lines supplement and complement the lines of Yale & Towne in this field.

Herbert E. Kresse has established his own textile mill accessories business with headquarters temporarily at 47 Fulton Street, Weehawken, N. J. Mr. Kresse was formerly sales manager of Hygrolit, Inc., Kearny, N. J., and Adolff Bobbin Co. He plans to represent several textile mill supply houses, especially in the bobbin line.

Quaker City Chemical Co., Philadelphia, has added to its southern staff Woods Wilson Huff, son of J. H. Huff, manager of Rockwood Mills. W. W. Huff will be attached to the Knoxville (Tenn.) plant of the chemical firm.

Pechin Belting Co., Frankford, Philadelphia, has purchased the complete equipment of James Barker & Sons, Philadelphia, who for many years made rub aprons.

Textile World Analyst

MARGINS SLIDE OFF AS DEMAND IS RELAXED

FOR the first seven months of the year, textile activity—based on total consumption of raw material—was 43% above the corresponding period of last year. More significant still, it was 2½% above the same period of the eight-year spread (1924-1931) which we have assumed as "normal."

Although August statistics are not available at this writing, it is certain that the rate of mill operations slackened that month. Many mills, especially in the cotton branch, shut down for a week or even longer—or curtailed the number of active machines. Nevertheless, it is also certain that the total for the first eight months is still very considerably above that of the first eight months of 1932.

As sales fell off in August, due to a combination of causes, manufacturing margins also shrunk somewhat in sections of the industry, but not alarmingly so. In carded cotton fabrics, as shown in Table I, the average margin for August was 21.4c. against 23.4c. in July; and on Aug. 30 it was 19.7c. In carded yarns, shown in Table II, the margin fell from 25.1c. on Aug. 9 to 22.3c. on Aug. 30 but the average for the month was slightly higher than for July. Yarn margins are still above cloth margins—a condition, of course, which is out of line. However, certain of the yarn prices have been largely nominal.

Due to the imposition of the processing tax, the cotton group of TEXTILE WORLD's price index numbers shows a decided rise for August. Leaving the tax out, however, the raw cotton index for August would have been 76, as compared with 110 with 4.2c. added to the market price.

In the wool group, where there is no processing tax, the various products have continued the rise that started in March, although at a diminished rate, and the relationship between the different indices has been well maintained. For the first time since last February the silk index decreased.

The effect of the broader demand for cotton is reflected in the figures released by the New York Cotton Exchange showing that, during the first three months of the new season since Aug. 1, the movement of American cotton into sight, i.e., the movement from farms and smaller towns of the South to the larger markets or direct to domestic mills, totalled 532,000 bales, compared with 400,000 in the same period last season and 287,000 two seasons ago. The balance available for movement into sight was then estimated at 14,237,000 bales, compared with 16,262,000 a year ago and 18,382,000 two years ago. Exports of cotton from this country during the first three weeks of the new season totalled 408,000 bales as compared with 325,000 in the same period last season and 151,000 two seasons ago.

In the editorial at the start of this issue of TEXTILE WORLD, attention is called to the inadvisability of counting on a consumer demand which would justify continued operations at the high rate which featured the late spring and early summer. In this connection, a report entitled "The Behavior of Consumption in Business Depression" published by the Graduate School of Business Administration of Harvard University is of interest. According to this report, the standard of living, as represented by consumption of so-called consumer goods, declined less than 10% during the depression. The conclusion is drawn that no great shortage of such goods has been built up which might be counted on to serve as a springboard from which the country could jump back to prosperity. This high-lights, on the one hand, the need for marked improvement in the capital goods industries if real recovery is to be made; and, on the other hand, the danger of counting too heavily on sharp increases in purchases of consumer goods.

TABLE I. CARDED FABRIC MARGIN

Date	Margin in cents	Date	Margin in cents
July, 1931.....	15.3	February, 1933.	10.1
October, 1931..	13.3	March, 1933....	10.2
January, 1932..	12.1	April, 1933.....	11.4
June, 1932.....	9.5	May, 1933.....	15.6
July, 1932.....	9.1	June, 1933.....	20.6
August, 1932..	11.1	July, 1933.....	23.4
September, 1932	13.0	August, 1933...	21.4
October, 1932..	12.6	August 9....	22.1
November, 1932	10.7	August 16....	22.3
December, 1932	10.6	August 23....	21.6
January, 1933..	10.4	August 30....	19.7

TABLE II. CARDED YARN MARGIN

Date	Margin in cents	Date	Margin in cents
July, 1931.....	12.6	February, 1933.	9.4
October, 1931..	12.7	March, 1933....	9.8
January, 1932..	10.9	April, 1933.....	10.1
June, 1932.....	9.9	May, 1933.....	12.3
July, 1932.....	9.6	June, 1933.....	15.4
August, 1932...	9.7	July, 1933.....	23.2
September,1932	12.8	August, 1933...	23.5
October, 1932..	12.3	August 9....	25.1
November,1932	11.3	August 16....	23.6
December, 1932	10.9	August 23....	22.8
January, 1933..	10.2	August 30....	22.3

▼ ▼ ▼

Textile World's Price Index Numbers

Date	Cotton Index Numbers: Cotton	Yarns	Gray	Colored	Wool Index Numbers: Wool	Tops	Yarns	Cloth	Silk Index: Raw Silk
July 31, 1924..	100	100	100	100	100	100	100	100	100
1925..... ...	187	188	189	176	223	229	224	233	143
1926.....	140	155	157	149	184	189	179	207	136
1927.....	140	153	159	153	181	184	187	195	119
1928.....	160	162	162	166	199	202	199	197	110
1929.....	153	144	145	167	176	179	192	211	108
1930.....	108	125	123	144	127	139	161	202	177
1931.....	68	93	92	119	99	112	134	161	
1932									
Jan.....	53	78	74	102	94	104	127	147	41
July.....	47	68	62	96	59	72	101	116	25
Oct.....	52	83	78	107	82	97	115	130	37
Dec.....	48	74	69	103	77	87	108	125	33
Jan. 1933.....	50	72	67	100	76	85	105	125	29
Feb. 1933.....	48	68	65	95	75	83	102	125	26
Mar. 1933.....	49	70	66	96	75	84	102	125	26
Apr. 1933.....	56	74	72	97	78	90	104	125	29
May 1933.....	69	93	94	101	104	113	116	169	34
June 1933.....	76	109	117	112	122	139	135	192	47
July 1933.....	86	138	135	131	134	153	156	201	50
Aug. 1933.....	110	170	151	147	136	157	159	217	41

Note: All cotton indices include processing tax.

TEXTILE WORLD'S

Cotton Digest

ANYONE who can cheer about the indicated results of the cotton acreage abandonment program must have some information we do not possess. We still feel that the textile industry is being asked to pay the bill for something of very questionable value—to agriculture and to the public interest.

When it became evident, last spring, that this type of farm relief was inevitable, we urged that cotton manufacturers cooperate to the fullest extent, irrespective of their opinions of the tax. We believe that cooperation has been forthcoming to a surprising degree. Secretary Wallace himself paid a tribute to the attitude of the cotton mill men.

Nevertheless it is our feeling that the relations between the cotton industry and the AAA are none too satisfactory; that a feeling of mutual antagonism has developed, quite in contrast with the mutual respect which seems to exist between the industry and the NRA.

We don't know the reason. Certainly the AAA should not resent the attempt of manufacturers to secure amelioration of a tax which they have always held to be unsound. Frankly, we believe the AAA might take a leaf out of the NRA book. Both sides might profit thereby.

August Goods Sales Reach Low Ebb

The virtual absence of buying interest in the primary market, manifested in the last few days of July, continued throughout August, with spasmodic flurries of buying in certain lines. Cotton-textile merchants and mills were engaged in repricing their lines early in August in order to take into account the "fair differentials" and the processing tax. The gradual decline in sales volume on print cloths reached a critical point about Aug. 15, when the majority of mills withdrew prices for 10 days, but the revival of buying interest at the end of that period soon died out. Toward the last of the month there was more business placed for combed goods and fancy weaves. The price trend was downward, being more severe in print cloths, as shown by the following examples: 38½-in. 64x60 print cloth which brought 7½c. on Aug. 1 declined to 6½-6⅝c., while 39-in. 80x80 likewise dropped from 10c. on Aug. 1 to 8¾-9c. by Aug. 31. The decline in price of 37-in. 48x48, 4-yd. sheeting was from 8⅞c. to 7¾-7⅞c.

•

Carded Sales Yarn Procedure

Carded yarn spinners meeting in Charlotte, N. C., representing about 1,700,000 spindles operating on sales yarn, adopted the following recommendations regarding allowances for the processing tax in quoting prices:

1. The figure to be included per net pound of finished yarn to equal the processing tax paid on cotton should be 4.83c.
2. The cost of processing tax shall be included in the quoted price for the goods, this entire gross price to be subject, as usual, to customary commissions and discounts, provided, however, that on all contracts taken prior to Aug. 1, 1933, the amount to be included to cover the processing or the floor-stock tax should be separately stated on the invoice and not subject to discount or commissions, unless otherwise specified.
3. Contracts made on or after Aug. 1, and until receipt of these recommendations, shall be billed according to the terms of the contract.

Captain A. M. Fairley, Laurinburg, N. C., chairman of the carded yarn spinners group, and Fred A. Rakestraw, Philadelphia, Pa., head of the cotton yarn merchants, were authorized to appoint a committee of ten for the purpose of drawing up a code of fair trade practice and a schedule of fair prices.

•

Processing Tax Details

Regulations governing the computation and collection of the cotton processing tax and the floor tax, which were issued by the Internal Revenue Bureau, have required much clerical work and resulted in no small amount of confusion. After the announcement that the cotton floor-stock tax must be computed in terms of pounds, the industrial recovery committee of the Association of Cotton Textile Merchants of New York issued a supplementary table of percentages of non-cotton ingredients in various kinds of cotton goods. Some items in this table follow:

Percentage of "Non-Cotton Ingredients"	Group—
5.61	Sheetings....Class A, 40-in. and narrower
6.11	Sheetings....Class B, 40-in. and narrower
6.14	Sheetings....Class C, 40-in. and narrower
5.51	Sheetings (Industrial) wider than 40-in.
6.62	Print cloths
6.62	Pajama checks
7.25	Drills
7.74	Four-leaf twills
8.00	Heavy warp sateen
6.62	Carded broadcloth
7.45	Tickings
7.50	Denims, 28-in.
5.00	Handkerchief cloth
2.23	Outing flannels, fancies
6.75	Enameling duck
4.50	Gray moleskins

•

Acreage Restriction

Cotton production control program as planned by the AAA involves limitation of planted acreage to 25,000,000 according to statement by Secretary of Agriculture Wallace. This means a reduction of about 15,000,000 acres from usual planting and is 5,000,000 acres below the expected harvest this year. The plan will work through rental and allotment benefit payments to farmers from funds derived from a processing tax.

•

Waste Market Upset

The cotton waste trade is engaged in adjusting itself to the changed situation brought about by the 4.2c. processing tax placed upon all cotton going through the mills. Consumers of cotton waste do not have to pay a similar tax.

The tax has eliminated for the time being the old-time method of buying and selling comber and strips on the basis of New York spot cotton price.

High prices on comber, strips, cop waste and similar materials in the American market have almost overnight cut off the export trade, but imports of foreign wastes now well below the market are gaining in importance and volume.

•

July Spindle Activity

Spindle activity during July, according to the Bureau of the Census, was at the rate of 117.5% of single shift capacity, as compared with 129.1% for June, 112.3% for May, and 51.5% for July, 1932. The cotton textile code limitations which became effective July 17, greatly reduced spindle hours during the last half of the month. Cotton consumption in July amounted to 600,143 running bales, as against 696,472 bales in June, and 278,568 bales in July, 1932. For the 12 months ended July 31, United States mill consumption amounted to 6,135,525 bales, as compared with 4,866,016 bales for the corresponding period ended July 31, 1932, a 26% gain.

Cotton Crop Set at 12,414,000 Bales

A cotton crop of 12,414,000 bales was forecast by the Dept. of Agriculture on Sept. 8 from data as of Sept. 1. This is an increase of 100,000 bales over the Aug. 1 estimate. The change was too small to have any decided effect on the market. Condition was set at 67.5%, indicated yield at 197.8 lb. per acre, and acreage for harvest at 30,036,000.

•

Industrial Relations Board Moves to Settle Disputes

The recently created Cotton Textile National Industrial Relations Board, consisting of Robert W. Bruere, chairman, B. E. Geer and Major George L. Berry, began functioning about the middle of August when a series of conferences were held with cotton mill executives and workers in South Carolina. It was explained that the board's primary objective would be to interpret the code, but that the first responsibility for dealing with grievances or complaints as to conditions of employment remained with employers and employees through individual factory industrial-relations committees.

•

Conversion Table for Processing Tax

For use in quoting prices, after Aug. 1, for cotton yarns and all-cotton fabrics so as to include the processing tax on the lint cotton required for their manufacture, a conversion table has been prepared and distributed by Rhyne, Moore and Thies, Charlotte, N. C., textile cost engineers. This table, in condensed form, includes the following conversion figures:

Net Percent of Waste	Tax Per Pound	Net Percent of Waste	Tax Per Pound
8	.04364	22	.05148
10	.04461	24	.05283
12	.04563	26	.05426
14	.04669	28	.05577
16	.04780	30	.05736
18	.04897	32	.05905
20	.05019	33⅓	.06038

•

Cotton Mill Statements

Kendall Co., Boston, Mass., reported net profit of $196,623, after charges for the first 24 weeks of 1933, as compared with net profit of $17,083 in the corresponding period last year. Balance sheet as of June 17, 1933, showed current assets of $6,656,411, and current liabilities of $1,195,861, a ratio of 5.5 to 1.

Pacific Mills, Boston, Mass., reported for the six months ended July 1, 1933, net profit of $477,486 after all charges, as compared with net loss of $2,645,907 in the corresponding period last year. Current assets as of July 1, 1933, amounted to $14,461,888, and current liabilities, $2,221,244, a ratio of 6.5 to 1. Net sales for the 1933 period were $14,888,573 against $10,210,796 in 1932. In the six months from Dec. 31, 1932, to July 1, 1933, the cash item on balance sheet had declined from $2,514,841 to $714,645. Accounts receivable went up from $3,259,702 to $5,686,811, and inventories went up from $5,242,116 to $8,060,433. Current liabilities increased from $575,380 to $2,221,244. Of the latter item $1,000,000 was in notes payable, an entry which had not appeared on the previous sheet.

Pepperell Mfg. Co., Boston, Mass., according to a preliminary statement, had net profit of $924,000 for the fiscal year ended June 13, 1933, as compared with net loss of about $1,199,558 in the previous fiscal year.

Victor-Monaghan Co., Greenville, S. C., reported net profit of $380,635, after depreciation and interest, but before reserve of $7,671 for 1933 income taxes, for the fiscal year ended June 30, 1933, as compared with net profit of $146,946 for the preceding fiscal year. Current assets as of June 30, 1933, amounted to $1,250,978, and current liabilities, $308,500, a ratio of 4 to 1.

•

Cotton Mill News

Lowe Mills, Inc., Huntsville, Ala., which were advertised for public auction on Aug. 23 were not sold due to absence of bidders and sale has been deferred to an indefinite time.

Fulton Bag & Cotton Mills, Atlanta, Ga., recently purchased 51 bag-seaming machines from the Union Special Machine Co., Chicago, Ill.

Bates Mfg. Co., Lewiston, Me., has lately purchased spinning frames costing a total of $184,125 equipped with Saco-Lowell Roth long draft.

General Cotton Supply Corp., a subsidiary of the **General Cotton Corp.** has purchased Nashawena Mill B at New Bedford, Mass.

Burlington (N. C.) Mills, Inc., have begun erection of new one-story addition for storage and distributing service, estimated to cost about $25,000. General contract was recently let to H. F. Mitchell, Burlington.

China Grove (N. C.) Cotton Mills Co., combed yarns, has awarded contract to Berger Bros., Mooresville, N. C., for erection of addition costing $28,000, with equipment. R. C. Biberstein, Charlotte, N. C., is engineer.

Textiles-Incorporated, Gastonia, N. C., large combed yarn spinning organization, operated during August at the highest rate of production in about two years, according to a statement made by A. G. Myers and R. Grady Rankin, co-receivers. Wages were advanced under the cotton textile code but substantial economies were effected in overhead costs. The mills were operating two 40-hour shifts.

Faytex Mills, Inc., Fayetteville, N. C., has been organized by R. L. Huffines, Jr., McDonald Dixon and G. L. Pruden, operators of the Claytex Mills, Inc., Clayton, N. C., to acquire and run the plant of the **Victory Mfg. Co.,** which is equipped with 14,336 spindles and 430 looms.

Rhodes-Rhyne Mfg. Co., Lincolnton, N. C., has begun superstructure for a new two-story addition to mill, 60x85 ft., to be used in part for expansion in weaving division. It is reported to cost over $24,000, with equipment. General contract was recently awarded to C. H. Harrill, Lincolnton.

Neuse (N. C.) Mfg. Co., has installed a new 200 hp. boiler, equipped with a Cokal automatic feeding attachment, etc.

Lily Mill & Power Co., Shelby, N. C., is constructing a new power plant at Stice's Shoals to replace the present plant which generates power for the mill.

Consolidated Textile Corp., Ella Division, Shelby, N. C., is reported to be engaged in alterations and building improvements costing about $28,000.

Pacific Mills, Hampton Division, Columbia, S. C., is installing 100 Draper X Model looms with individual motor drives in the Olympia Mill.

Union-Buffalo Mills Co., Buffalo, S. C., has installed 172 additional looms (40-inch, Model E Drapers), making the total number of looms now 2,001.

Gaffney (S. C.) Mfg. Co. has completed the installation of 400 new looms.

Limestone and **Hamrick Mills,** Gaffney, S. C., recently installed 12 speeders and 32 spinning frames.

Lancaster (S. C.) Cotton Mills. Installation of four shears at Lancaster, Fort Mill and Chester plants, have been previously incorrectly described in these columns. These shears were made by Hermas Machine Co., Hawthorne, N. J., and bought by the mills through Carolina Specialty Co., Charlotte.

Kendall Co.'s Oakland Mill, Newberry, S. C., has been repaired and reroofed by C. M. Guest & Sons, Anderson, S. C. Mollohon Mill of the same company is having new roof and insulation installed by the Guest firm.

Brazos Valley Cotton Mill, West Waco, Tex., has leased the former Waco Twine Mill, Waco, and will occupy for a new branch mill.

COTTON IN THIS ISSUE

	page
Rayon in Cotton Mill; Larger Skeins and Cones	63
Status of Textile Codes Shows Rapid Progress	79
Textile Codes at a Glance	80
Effect of Code Cannot Yet Be Gaged Accurately	84
Processing Tax—Is It Straw That Breaks Back?	85
What About New Products in Yarn	86
Loom Test Analysis—Causes for Stoppage	88
New Method for Merinos on Cotton System	90
Ageing Vat Colors	92
Weaving Necktie Lining	101
Cotton-Rayon Nub Yarn	101
Preventing Rust in Machine Conditioning	103

TEXTILE WORLD'S

Wool Digest

IT would be pleasant if the operation of the wool textile code automatically prevented over-producton. But it just doesn't. If all the mills in the country should run their productive equipment two forty-hour shifts for a full year, we imagine there would be a rather vexing problem of surplus stocks.

Consequently, it is essential that a check be kept on operations. Rate of activity has been high; response of consumers is still a questionable factor. It is not in the public interest to supply employment now, if the result is to be instability and distress a few months from now.

All of which leads up to the importance of prompt development of the statistical function provided for in the code. It is encouraging to learn that this statistical work is getting under way. Delay in making this work effective might prove costly.

Arthur Besse, New Head of Wool Manufacturers

The new president of the National Association of Wool Manufacturers, Arthur Besse, went into office on Sept. 11. He was the unanimous choice of the committee empowered to select a successor to Harold S. Edwards. This committee comprised Franklin W. Hobbs, chairman, and Messrs. Hird, Lennihan, Mitchell and Noah.

The committee is enthusiastic over Mr. Besse's qualifications, as he has a high reputation for tact and executive ability and knows the language of the wool goods industry, yet coming from outside the industry he is free from entanglements with group interests. Mr. Besse is 46 years old, son of the late head of the Besse System, a former chain of clothing stores which dotted New England. He was graduated from Harvard in 1909 and entered his father's business. His career in the clothing field was interrupted by war-time work with the Chemical Warfare Service, in which he rose to rank of lieutenant-colonel. He returned to the Besse System after the war, continuing his connection there for some 10 years. He then joined the firm of Hale, Waters & Co., investment bankers, New York, as partner and retired from active business in 1931. He knows the wool-textile industry as a buyer of its products. He lives in Scarsdale, a suburb of New York.

•

Start Statistical Work

The National Association of Wool Manufacturers is making progress in shaping up the statistical work necessary to the carrying out of many of its code provisions. The National Credit Office has been selected to function on statistics for the Association. It will be remembered that this body operated a similar service under the late Herbert Peabody, which was continued under the standard of the Wool Institute. It is the preference of the wool industry that these statistics be handled by an outside, disinterested party.

•

Wools Move to New High Ground

The wool market moved to new high ground late in August on heavy buying by manufacturers and topmakers. For the first 20 days of the month the market was inactive and the price level horizontal. On sales of about 20,000,000 lb. which followed, an all around advance of 5% occurred. The market opened Sept. 1 active, with sales establishing the new line of quotations.

The advance in wool during the last few months has resulted, dealers say, from natural causes rather than from mere speculation. Stocks of old wool had disappeared by May and a large proportion of the 1933 clip, financed by government agencies, has been taken off the market. The course of the market for year to date is as follows, in averages:

	Territory (clean)	Fleece (grease)
First quarter	38.9c.	18.6c.
Second quarter	53.0c.	24.9c.
July	69.7c.	32.3c.
August	72.3c.	34.0c.
Sept. 1	74.4c.	34.7c.

•

Tops Still Advancing in Early September

Wool tops closed on Sept. 6 at high for the movement so far as the nearer months were concerned. September closed at 96.7c. and January at 97.7c., against 95c. and 95.1c., respectively, on July 28; 83.9c. and 84.5c., June 2; 66.2c. and 67.5c. on April 29. Boston spots were 104.5c. on Sept. 6, against 101.5c. July 28; 86.5c., June 2; 8c., April 28. There was strong demand in the open market for tops and spots on the exchange maintained a good premium over the current month. It is estimated in the industry that the NRA code provisions have added 3½c. to 4c. to conversion cost to make top from raw wool.

•

Jump in Wool Imports

In the one month of July, 1933, this country imported 10,216,364 lb. of wool (other than carpet wool), against only 5,800,791 lb. of similar wool in the entire six months period (January to June) preceding. Increased importation of carpet wool was about on the same scale.

•

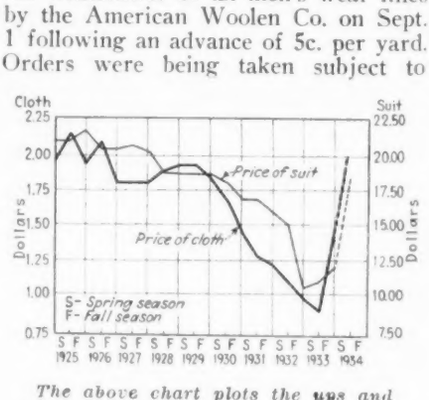
Worsted Yarns Firm

Worsted yarns have been firm, though slow to register the advances which seem justified by code operation and by higher wool prices. Knitters are sampling for their new season and weavers are picking up small lots to fill in. As the cost trends upward possibility of imported yarn becomes subject of conversation. It is believed, however, that the industry will be protected against any hurtful increase in foreign competition.

•

Good Season Foreseen in Fabric Market

Trade in woolens and worsteds was fairly brisk toward the close of August following a brief dull period. Mills have been selling well into the spring season. Since formal openings are not expected until about Oct. 1, these goods have been sold "at value." Mills are in a strong position, as evidenced by the withdrawal of all men's wear lines by the American Woolen Co. on Sept. 1 following an advance of 5c. per yard. Orders were being taken subject to



The above chart plots the ups and downs in price of a men's wear staple mixture worsted and of a suit made by a representative clothier from that cloth. It is reproduced from the "Daily News Record." It can be seen that the wholesale price of the cloth dropped faster and further than did the price of the suit during the depression. Prices for spring 1934 (which are estimated by the maker of the chart and given in dotted lines), disclose the cloth price leading the price of the suit upward to levels approximating those of 1928 to 1930.

prices to be named later. There has been growing interest in summer specialties.

The reported spurt to retail clothing sales is encouraging. One authority states that clothing sales for the season so far are 35 to 40% ahead of last year. Wool goods for women's wear have been centers of interest, and settlement of the dress strike in mid-August released further buying. The fall season promises to be one of the best in these lines for some years.

Better grade lines for men's wear, which opened last March at around $1.65, are reported to have sold at $2.75 for spring season deliveries.

•

Wool Textile Committee Under NRA Code

National Association of Wool Manufacturers announced the appointment of the Wool Textile Industry Committee as follows:

"Pursuant to the executive order and subject to the approval of the method of selection by the administrator under NRA, H. M. Ashby, Millard D. Brown, Lewis A. Hird, Moses Pendleton and Ames Stevens were elected to serve as the representatives of the wool textile industry on the Wool Textile Industry Committee required by the executive order, and A. L. Green, Richard Lennihan and F. W. Tipper were designated alternate members authorized to act as a member of said committee at any meeting thereof in place of any regular member who is unable to attend such meeting."

•

Wool Goods Mills Hit Snarl on Surcharges

The question of achieving uniformity in surcharges to cover added cost of NRA code operation proved a difficult problem to woolen and worsted mills when the code became effective in mid-August, but by the end of the month this situation had clarified somewhat. Mills which attempted to reach a surcharge basis by using the cotton industry's method of selecting a standard construction were bewildered because of the wide variation in construction in their field. To solve the problem, mills now are arbitrarily setting surcharges based on study of the respective cost of individual fabrics.

The method of spreading surcharges adopted by a leading company follows: Worsteds—25%, 50% and 75%, respectively, for the first three weeks, with 100 the fourth week; woolens—33⅓% and 66⅔% for the first two weeks and 100% the third week.

•

$22.50 Suit Comes Back

The rise in price of men's wear woolens and worsteds has brought many of the one-price suit chains back to the $22.50 level which was for current for some years before 1931. Richmond Bros. Co. have advanced their retail price from $18.50 to $22.50; Howard Clothes have gone from $17.50 to $22.50; Crawford from $16.75 to $22.50. Several other chains, although making advances, are still several dollars below $22.50. It is alleged that improvements in fabrics and tailoring technic renders the new clothing lines superior to similar lines at the same price before the depression, and therefore more keenly competitive with clothing in the higher brackets.

•

Botany to Move Nearer Garment Center

Botany Worsted Mills have leased the 15th floor of the Continental Building, 1450 Broadway, and will remove to that location from 200 Fifth Ave. when alterations are complete. Other new textile tenants in the Continental Building are Lorraine Mfg. Co. and Textiles, Inc. There has been a trend on the part of fabric sales offices catering to the women's wear trade to move nearer the garment center on Seventh Ave. Started by silk houses which opened branches in that neighborhood some years ago, the trend has grown without setback.

•

Lastex Aids Fit

A novelty in men's clothing which may become a standard of the future is being shown in Metropolitan clothing stores. The feature is use of elastic cloth, which permits an unusually good fit and absence of strain as the wearer moves about. The fabric contains Lastex, but in appearance is like any standard men's wear. H. Daroff & Sons, New York, are the manufacturers.

•

Wool Mill Statements

Bigelow-Sanford Carpet Co., Inc., made an operating profit of $251,625 during the first six months of 1933, but a deduction of $371,163 for depreciation and adjustments changed this into a net loss.

Botany Worsted Mills, Passaic, N. J., are now showing a profit according statement issued by chairman of bondholders protective committee. It was recently reported that Botany's statement for 1932 showed a net loss for that year of $1,355,022, against a net loss for 1931 of $2,126,726. Net sales were: 1932, $8,343,596; 1931, $7,891,460.

WOOL IN THIS ISSUE

	page
Status of Textile Codes Shows Rapid Progress	79
Textile Codes at a Glance	80
Effect of Code Cannot Yet Be Gaged Accurately	84
Composite Worsted Yarn Mill—Best Features	89
New Method for Merinos on Cotton System	90
Research on Fulling Points Way to Change	95
Woolen-Mule Clocks	100
Penalizing Wool Weaver	101
Woolen Ring-Spinning Frame	102

Wool Mill News

Westbrook Weaving Co., Portland, Me., recently organized to manufacture woolens, has leased the former local mill of the Haskell Silk Co., and will occupy at once.

Goodall Co., Sanford, Me., is building a new plant near Knoxville, Tenn., for manufacture of Palm Beach clothing from its own fabric. The plant now operating in Knoxville has been running full time.

Carl Weymouth, Newport, Me., has purchased from the American Woolen Co. a plant in Pittsfield, Me., formerly used in producing yarn. The new owner is renovating the buildings and equipment and installing machinery for wool pulling and shoddy.

Peerless Woolen Mills, Rossville, Ga., plans enlargement of floor space by addition of a second story to No. 1 weave room building. This will represent an expenditure of about $20,000.

Hanover (Ill.) Woolen Mills, Inc., recently organized with capital of 29,000 shares of stock, has taken over local mill formerly operated by the Hanover Woolen Mfg. Co., idle for some time, and will place it in operation. New company has been chartered by M. E. Finney and H. E. Steele, both of Hanover. Hugh Stein will be in charge.

H. L. Mitchell, Winona, Minn., and associates, have acquired a building at Onalaska, Wis., at one time used as a yarn spinning mill, and will remodel and equip for new mill for manufacture of woolen goods.

James Lees & Sons Co., Bridgeport, Pa., has taken bids on general contract for addition to mill, and plans to place building award at early date. Ballinger Co., Philadelphia, is architect.

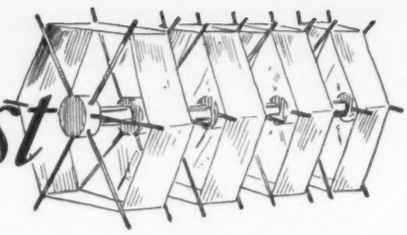
Majestic Woolen Mills, Philadelphia, Pa., recently organized, have leased a floor in building at D and Tioga Sts., totaling about 3,200 sq. ft. space, and will occupy for new mill unit.

Botany Dryspinners, Kincardine, Ont., Canada, spinners and dryers of dry-combed Botany yarns, have installed 1,200 additional spindles.

Carleton Mills Ltd., Carleton Place, Ont., Canada, were recently sold by the trustee in bankruptcy to M. J. O'Brien Ltd., Renfrew, Ont., proprietor of the Renfrew Woolen Mills.

TEXTILE WORLD'S

Silk Digest



WE think it safe to say that there has been less unity among silk manufacturers during these trying codification days than in any other branch of the textile industry. There has been an open breach on the problem of the minimum wage. There has been conflict over the prerogatives of associations in specific branches. There has been sectional antagonism.

Anyone who is familiar with the extreme decentralization of the silk industry is not surprised by this condition. Nevertheless it must be remedied. A surer sense of leadership, backed by a submerging of selfish interests, must be forthcoming if the industry is to play its part in the recovery movement. It is not possible to please all groups; majority opinion will have to rule here just as it is being permitted to rule in all industry.

Japanese Delegation Visits United States

Under the chairmanship of the veteran Senator Gosuke Imai, a delegation of eight, representing every branch of raw silk producing and exporting business of Japan, visited this country under the sponsorship of the Central Raw Silk Association of Japan. According to Senator Imai, the purposes of the visit were to view the Century of Progress, where Japan has an extensive exhibit, and to discuss problems with silk users in this country. Under the latter head discussions have been held on the possibilities of raw silk promotion, improvement of quality of raw silk, stabilization of prices, improvement in methods of merchandising, and the establishment of an international raw silk testing house and uniform methods of testing.

The prospects of a promotional campaign to stimulate the usage of silk appear to be better than for a number of years. There has been considerable talk in the past but little action. The present delegation, although it will probably report back to Japan before anything definite is done, seems to be convinced of the need for a campaign and impressed by the fact that silk producers in Japan and importers in this country must supply the principal impetus.

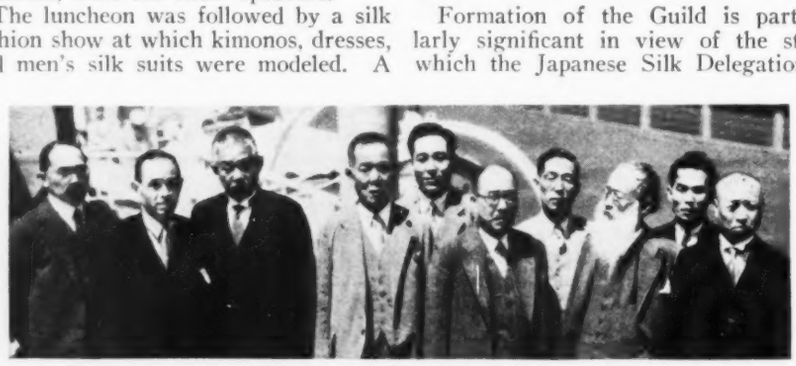
The delegation was honored both at Chicago and New York. The Chicago visit was climaxed on Aug. 19, three days after the arrival of the delegation, by a luncheon which was tendered to the executives of Silk-using mills of the Middle West, and their friends, to celebrate "Silk Day."

The principal address was made by Senator Imai, known as "father of the silk industry," who said that one of the main objects of his trip was to win American men to the wearing of silk suits. He stressed the point that, while their research had developed the fact that raw silk is adaptable to use for men's suitings, Japan does not intend to enter into competition with American clothing manufacturers, but wishes to bring to them the result of their research so that they may create a new industry in America. Rufus Dawes, president of a Century of Progress, and Ramsay Peugnet, vice-president and treasurer of the Silk Association of America, were the other speakers.

The luncheon was followed by a silk fashion show at which kimonos, dresses, and men's silk suits were modeled. A later fashion show was staged in the hill garden of the Japanese Pavilion at a Century of Progress.

On Monday the delegation was conducted by C. Walter Seidel, who helped to arrange their Chicago itinerary, on a tour of silk-using plants.

The luncheon in New York, held Aug. 29, was jointly sponsored by the Silk Association of America, the National Association of Hosiery Manufacturers and the Commodity Exchange, Inc. Henry E. Stehli, vice-president of the Silk Association, Earl Constantine, executive director of the National Association of Hosiery Manufacturers, and Jerome Lewine, president of the Commodity Exchange, speaking for their organizations, praised silk as a fiber and assured the delegation of cooperation. Senator Imai's address outlined the purposes of the visit and touched upon the bright prospects for raw silk as a result of cooperation between producers and users.



International News Service

The Japanese Silk Delegation arriving in this country. In the group above are left to right: Kikuzo Takeoka, manager of Yokohama Specie Bank of San Francisco, who greeted the arrivals; Tetsuzo Nagaoka, Kannoji Tomita, Takashiro Arai, Tomoo Kojima, Senator Gosuke Imai, Chiesei Kato. Left to right (rear) Mantaro Matsumoto, Soichiro Adachi, and Sho Shirai.

•

Guild Formed For Silk Promotion

Shortly before the Japanese Silk Delegation arrived in New York, prominent members of the raw and thrown silk trade in this country formed the International Silk Guild, Inc., the purpose of which is to promote the use of silk. Paolino Gerli, vice-president and general manager of E. Gerli & Co., is credited with being the instigator of the move, but it is planned that there will be no officers, except an executive secretary, and that a board of directors will function in an executive capacity. At time of writing the following had accepted invitations to be members of the board:

William Meyer, president, Apex Hosiery Co.; C. W. Sinn, vice-president, Julius Kayser & Co.; Phillip A. Vogelman, president Onondaga Silk Co., Inc.; Ward Cheney, president, Cheney Brothers; Jacob Widder, president, Widder Bros.; Joseph Gerli, vice-president and treasurer of E. Gerli & Co.; Paolino Gerli, vice-president and general manager of E. Gerli & Co.; M. A. Salembier, president Salembier & Villate, Inc.; Douglas Walker, president, Douglas Walker & Co.; Oscar Heinemann, president, Oscar Heinemann Corp. of Chicago; Louis Kahn, president Kahn & Feldman, Inc.; Jerome Lewine, president, Commodity Exchange, Inc.; Raymond C. Kramer, president, Belding Heminway Corticelli Co.

Formation of the Guild is particularly significant in view of the study which the Japanese Silk Delegation is making of the possibilities of promotional work. A meeting between the two groups was held on Sept. 2, but details were not made public. It is expected that there will be close cooperation between the Silk Guild and Japanese producers if a promotional campaign is launched.

•

Raw Silk Prices Hold Relatively Firm

Fluctuations in the price of raw silk were relatively narrow during the month of August, despite the fact that sales were small. On the exchange, Septem-

ber, futures opened the month at $1.85 dropped to a resistance level of $1.73 and then rallied to $1.81 at the end of the month. The complicated situation with respect to the future relationship between the yen and the dollar was generally held to be the reason for prices holding up so well in the face of limited demand; talk of actual inflation in this country being prevalent and sellers inclined to sit tight and await developments rather than try and force sales by lower prices in the face of apathetic buying.

Under the circumstances, deliveries of raw silk to the mills will probably show a decided drop for August as compared with July, despite the fact that actual consumption during the month was quite fair.

•

Broadsilk Market Remains Hesitant

Settlement of the dress strike in New York did not give the impetus expected to broadsilk sales and at the close of August the weaving strike in Paterson added another note of uncertainty. Under the circumstances, it is not surprising that prices quoted by producers for the same construction varied about 10%. By Sept. 12 the Paterson industry was still closed down and effects of the strike were in the closing of finishing plants in and near Lodi.

It is believed that the weavers' strike will be the determining factor in future developments. There was a slight flurry of buying when the strike announcement was made, but so many divergent views were held as to the date of settlement that buyers were inclined to go slow. Although it is certain that the large accumulation of stocks during June and July accounted for the August lull, if it becomes evident that the strike will be protracted and widespread, a scramble on the part of the buyers will result.

•

New Orders For Thrown Yarns Scarce

Users of thrown yarns built up such large stocks in June and July that new orders were few and far between during August, but it is expected that the situation will change about mid-September. Prices have held reasonably firm considering the lack of new business. An interesting sidelight on the situation is that an exceptionally large number of bobbins are tied up.

•

Broadsilk Mills Adopt "Fair Practices"

Rather than await the hearing on the code for the complete industry, broadsilk manufacturers and converters adopted the "competitive practices" clauses of the code prepared by the Silk Association on Sept. 1. Over 150 signatures were secured at a mass meeting held on Aug. 24 and others signed later. In brief, the clauses in question include:

1. Equal terms, prices and advantages to all buyers similarly situated.
2. No orders to be taken below cost.
3. Goods shipped on consignment shall be invoiced as of date of shipment if not returned within ten days.
4. Any dispute or claim must be made within ten days. No claims after goods have been cut.
5. It is unfair competition to place an order for a jacquard or print design, or to weave or print any such design, that has not been registered with the proper bureau of the Silk Association (sewing threads, tie fabrics and flosses excluded).
6. All transactions in excess of $500 shall be confirmed by signed contract. (Purpose is to assure that all details of such transactions will be readily ascertainable by an inspection of books and documents.)
7. Selling terms for broad goods to be either 6/10/60 or a maximum of 8/10 e.o.m. Dating as of the first of the following month may be given on goods delivered after the 25th. No anticipation at a rate higher than 6% per annum. No optional terms.

•

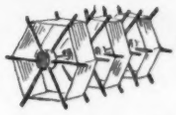
Unusual Textile Photography

A series of photographs of the various occupations engaged in the production of the fabrics of the Shelton Looms forms the basis of a portfolio issued in connection with a booklet "Through the Threads" published by Sidney Blumenthal & Co., Inc., New York. The photographs were done by Lewis W. Hine, artist and photographer, who has done similar work in several other fields. The series is 20 in number and each one not only shows a particular process, but, through the photographing of the operatives, represents graphically the human phase of it.

•

Silk Employment Gains

With the silk industry operating temporarily under the cotton code after July 17, employment for July was 64.6% higher than for the same month last year and 16.8% higher than for June, according to the figures issued by the Silk Association of America. Broadsilk loom employment increased 17.8%, narrow silk loom employment increased 1.6% and spinning spindle employment increased 16.0% during July as compared with June.



SILK IN THIS ISSUE

	page
Fabrics of Today—Silk and Rayon Types	71
Status of Textile Codes Show Rapid Progress	79
Textile Codes at a Glance	80
Effect of Code Cannot Yet Be Accurately Gaged	84
Silk Classification; Higher Seriplane Standard	93
Unsatisfactory Silk Winding	100
Acme Twister for Silk and Rayon	102
Bakelite-Head Bobbin	102
Uni-Twist Bobbin	103

Silk Mill News

A. H. Rice Co., Pittsfield, Mass., is about to erect an addition of two stories and basement, brick, steel and concrete, 76x100 ft., costing $18,000, to increase capacity for manufacture of silk thread and braid. Will be ready for occupancy Oct. 15. S. M. Green Co., Springfield, Mass., is architect; A. L. Phelps, Inc., Springfield, is contractor.

Holt, Grant & Holt plant, Altamahaw, N. C., is under a development program for **Glenn Raven Silk Mills, Inc.,** which is a newly organized industry. Roger Gant and A. E. Gant are managers.

Majestic Silk Mills, Inc., Allentown, Pa., have begun construction of one-story addition to branch mill at Buena Vista, Va., 60x100 ft., for which general contract recently was let to B. F. Parrott & Co., Roanoke, Va., estimated to cost $30,000, with equipment.

Schwarzenbach Huber Co. plans installation of 800 additional looms at Front Royal, Va., plant transferred from the firm's Altoona, Pa., plant.

Associated Textiles of Canada, Ltd., Louiseville, Que., has announced plans for the erection of a new weave shed to accommodate an additional 250 looms for the production of silk and rayon fabrics, as soon as business improves.

Brubacher Silk Mills, Valleyfield, Que., has been acquired by Grouts, Ltd., St. Catharines, Ont. The Brubacher plant of 144 looms will be confined to the manufacture of rayon fabrics, while the St. Catharines plant will be run on silk fabrics.

Silk Industries of Canada, Ltd., Actonvale, Que., which started operations two months ago now has 70 looms running and expects to have the remaining 24 in operation sometime in September. The officials are planning to install silk throwing machinery. P. P. Demers has control of the plant.

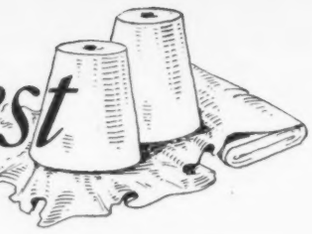
•

Silk Mill Statement

Belding Heminway Co. reports net profit of $160,017 for the first six months of 1933, equivalent to 36c. a share on 465,032 shares of no par common. A net loss of $252,621 involved 1932 operations over the corresponding period. The new organization with R. C. Kramer as president, has just completed its first full year of administration and operation. For that period the profit was $267,700 as compared a net loss of $1,016,000 the previous twelve months.

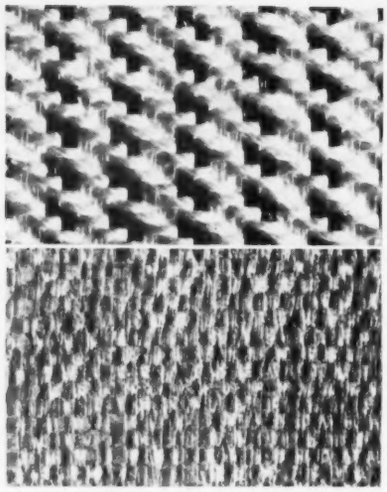
TEXTILE WORLD'S

Rayon Digest



THE NRA has decided that there *is* a rayon weaving industry. This, plus other recent developments, indicates the emergence of the synthetic fiber industry as a separate entity. Yarn production has been so considered in the past, but it was customary to think of rayon, from there on, as a part of the cotton or silk industry, or other division.

The point at issue is fine enough to warrant some very profound academic discussion. However, our own feeling is that that isn't necessary. We merely draw the practical conclusion that an industry which has grown from an annual production of 9,000,000 lb. in 1920 to something over 200,000,000 lb. in 1933 is entitled to anything it asks for, in the way of nomenclature or individuality.



Materials illustrated above are constructed with narrow strips of Cellophane, either alone with a backing of cotton sheeting or in combination with rayon. The products, known as "Luvet," are handled by the Chicopee Sales Corp., New York. Fabrics with cotton backing are used as wall covering in the Masonite House at the Century of Progress. The Cellophane and rayon fabric above is designed for women's hand bags, etc. Other uses are lamp shades, bed spreads, women's shoes, draperies, etc.

Yarn Producers Association Under Way

Indications are that synthetic yarn producers will get together to form a trade association, although details are not known at the time this is written. S. A. Salvage, president of the Viscose Co., and E. R. Van Vleit, treasurer of Tubize Chatillon Corp., have been active in preparing plans, while C. H. Le Roy, who has had many years of experience in the rayon and trade association fields, has been retained in a secretarial capacity.

Manufacturers principally engaged in the production of viscose process yarns have been working together for some time in connection with the code, but it is believed that there is need for a definite organization. It is hoped that difficulties may be straightened out so that producers of synthetic yarns by other than the viscose process will join the group.

•

Fabric Prices Shift About

The rayon fabric market was subjected to several influences during August that had a rather dampening effect on the more enthusiastic, but the tone at the end of the month, somewhat paradoxically, was quite cheerful. In the first place, those who had cheerfully boosted prices a bit too steeply as a result of code operation found that there simply was not business enough to maintain such levels. One popular crepe, for example, was quoted by some houses about 10% above the market. When there were few sales the price was dropped 15% at first and it was a week or two before such abnormal gyrations were smoothed out.

The dress strike in New York was the next factor to cause uncertainty in prices. Here again there was a tendency to change quickly from optimism to pessimism although most everyone believed that the strike would be of short duration. Settlement served to restore a more normal tone to the market. In the meantime, the most significant development from the style standpoint was a shift in demand away from failles, with the exception of the ribbed types, to cantons. Buyers were anxious to secure what they could of the latter weaves and prices reflected the situation, advancing 10% in some cases. It is believed that overproduction of failles and underproduction of cantons had more to do with the situation than any decided style trend. The trade is now sitting back and predicting great things for October.

•

Rayon Yarn Exports Up Sharply

Exports of rayon yarn from the United States for the first half of 1933 were 571,927 lb., as compared with a total of 690,000 lb. for the entire year 1932. Exports of woven rayon goods were valued at $76,677 for June and $448,287 for the first half of 1933. Value of all rayon manufactures exported for the period was $1,274,938.

•

Rayon Yarn Market Holds Steady

As was generally expected, there was no great rush to buy when yarn producers opened their books for November delivery the first of this month. Neither was there such a decided slackening off that anyone worried. Plants are well sold through October and are still shipping on the allotment basis. As stocks on hand in producers' plants are subnormal, a reasonable slackening in demand will merely give them a chance to build up the usual reserves. The rayon yarn market has been the steadiest of any during the last few months and nothing has appeared to date that should alter the situation.

•

W. H. Furness Leaves Furness Corp.

W. H. Furness, president and a receiver in equity of the Furness Corp., Gloucester, N. J., made known his resignation as president last month, although he continues as a receiver until released by the court. Mr. Furness founded the concern bearing his name and invented the continuous process of making cuprammonium yarn that is used in the plant. Dr. Arthur Mothwurf, as noted last month, was recently made general manager of the company which has been in receivership for several months.

Mr. Furness has not made known his plans for the future, but the supposition is that he will continue in the business of manufacturing yarn.

•

Rayon Deliveries Index

Through the cooperation of producers representing 98% of the American rayon industry, *The Textile Organon*, published by Tubize Chatillon Corp., presents in its current issue an index of monthly poundage deliveries from 1923 to date. This is the first time any monthly data on the industry have been available.

For the purpose of this statistical study, "rayon" is defined as artificial

silk made by the viscose, cuprammonium, and nitrocellulose processes. The index is called "rayon deliveries" because it represents the shipments of these three types of rayon by all American producers (the 98% data were inflated to 100%) plus imports of rayon less exports of rayon.

The outstanding characteristic of the rayon deliveries curve, as shown in the *Organon*, is of course its rapid rate of growth and extreme fluctuation. The fluctuation has become progressively more violent since 1930.

•

Increasing Widths of Silk and Rayon Looms

It is interesting to note that many of the new orders from silk and rayon mills are for looms 56 in. and 58 in. between swords, according to the Crompton & Knowles Loom Works. This is in keeping with the trend which started back in 1880 when the Knowles Loom Works made its first silk looms for Cheney Brothers. The intervening table of loom widths is as follows:

1890.....35 in.	1920.....52 in.
1900.....37 in.	1925.....54 in.
1905.....45 in.	1933.....58 in.
1910.....48 in.	

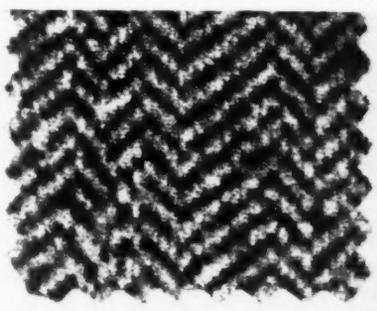
"In considering the question of replacement, there is," Crompton & Knowles states, "not only the element of obsolescence but of inadequacy. Many mills are finding and will continue to find that they lack adequate reed space for today's qualities. The far-sighted mill in working out a replacement program will look ahead and anticipate still greater widths."

•

Rayons in French Creditors' Collections

Many new weaves using all-rayon or rayon mixtures are listed as part of the winter collections of the leading French fabric houses, according to the Paris office of the Du Pont Style Service. Some of the fabrics mentioned by the Service are described as follows:

Rodier, who is known for the suppleness of his fabrics, includes in his new winter collection practically every recent weave development in charming, delicate treatments. There is a striking novelty weave of wool and rayon that shows a tiny boucle of rayon chenille on a woolen ground; and there is Brylap, which has self-colored stripes and is made of wool, rabbit's hair and rayon.



This is a new all-rayon knitted fabric known as "Korospun." It has a full and soft cover on the face, is printed to imitate a woven herringbone and has the appearance of a fine worsted. It is of very soft texture throughout and the back is clear, smooth, and comfortable to the skin. The new fabric is a product of Edwin I. Golding, Inc., New York; and it can be printed also to imitate tweeds, diagonals, and checks, as well as typical silk effects, such as polka dots. The Viscose Co.'s Crown rayon is employed.

New weaves using rayon or rayon mixtures are being shown by Bianchini. Most of them have as a theme some version of the furrow. This collection features a wide variety of fabrics, including velvet, crepe, taffeta, organza, lame and etamine.

Ottoman types lead the procession of fashionable crepe weaves, among which are rayon and wool mixtures, while some ottomans have a frosted surface. Faconnes in this collection show crepe satin backgrounds and diagonal weaves, or broche flowers.

Ducharne stresses two fabric types in his new collection: velvets and ribbed materials of the ottoman or faille variety.

•

Rayon Mill News

American Enka Corp., Enka, N. C., plans to spend about $500,000 for replacement of obsolete and worn machinery during the next 12 months. About $600,000 for this purpose was expended during the last 12 months.

Cleveland Cloth Mills, Shelby, N. C., are completing construction of a new one-story addition, 110x300 ft., and will equip at early date for rayon weaving department. General contract for structure was let several weeks ago to the Fiske-Carter Construction Co., Spartanburg, S. C.; Lockwood Greene Engineers, Inc., Spartanburg, are architects and engineers.

American Bemberg Corp., and **American Glanzstoff Corp.,** Elizabethton, Tenn., announce an expansion program, which includes a new cafeteria which will cost approximately $50,000.

Tennessee-Eastman Corp., Kingsport, Tenn., has authorized an expansion and improvement program in mechanical department, including construction of new four-story addition to power house, 63x85 ft., and installation of new filtration plant to increase capacity from 2,600,000 to 5,500,000 gals. daily. Work will cost over $100,000, with equipment. The Ridge Construction Co., Rochester, N. Y., will be in charge.

DuPont Rayon Co., New York, N. Y., has authorized an expansion and improvement program at mill at Old Hickory, Tenn., including enlargement in power plant and other mechanical departments, and installation of equipment. At later date, rayon mill division will be extended. Program will be carried out over a period of months, estimated to cost close to $2,500,000, with buildings and machinery.

E. M. Holt Plaid Mills, Burlington, N. C., will take over and operate the former Belmont Mill, located four miles from Burlington, converting the plant to rayon weaving. The building is being remodeled and will accommodate modern throwing equipment and 150 looms which are to be installed within 60 days.

Stonecutter Mills Co., Spindale, N. C., recently completed a one-story mill addition, 250x100 ft., of brick and steel construction. It was announced that the company has purchased 230 new Crompton & Knowles "Super" silk and rayon looms which will replace a portion of the original weaving equipment. J. E. Sirrine & Co., Greenville, S. C., handled building plans.

Blue Ridge Rayon Mills is the new name for the plant of the Altavista (Va.) Cotton Mills now owned and operated by the Burlington (N. C.) Mills Co.

RAYON IN THIS ISSUE

	page
Another Milestone in Synthetic Fibers	55
Rayon Output—208,000 lb. for U. S. in 1933	55
Rayon Is Better; Strength, Fineness, Pliability	56
Year's Developments in Rayon Manufacture	58
Expansion of Quality Outlets 1934 Keynote	60
Reduced Costs Mark Progress in Rayon Throwing	62
Rayon in Cotton Mill; Larger Skeins and Cones	63
Wide Choice of Materials to Size Rayon Warps	64
Improved Finishes Attest Gains in Processing	66
Rayon in Hosiery; Dull Luster, Fine Filaments	68
Rayon Underwear; Larger Cones, Magazine Feed	70
Rayon Fabrics of Today, Illustrated	71
Status of Textile Codes Shows Rapid Progress	79
Rayon Code Approved	83
Cotton-Rayon Nub Yarn	101
Acme Twister for Silk and Rayon	102
Bakelite-Head Bobbin	102
Draper Model C Rayon Loom	103
Uni-Twist Belting	103

TEXTILE WORLD'S

Knit Goods Digest

SINCE last month, the hosiery code has been given final approval. The executives who labored on it deserve congratulations for their original effort, and for their mental flexibility in so soon producing a revised draft to meet objections which developed at the hearings.

What is needed now more than any one thing in this branch of textile manufacture is the perfection of an agency which will deal effectively with the labor problem. The perennial clash between union and non-union mills makes this field an unusually difficult one. We believe, however, that the success of the recovery movement demands that management and labor find some solution other than warfare.

New Full-Fashioned Group Formed

At a meeting of hosiery manufacturers of the Pennsylvania district, held in Philadelphia, Aug. 24, it was decided to form the Full-Fashioned Hosiery Association, Inc. William Meyer, who is president of the Apex Hosiery Co. and president of the National Association of Hosiery Manufacturers, heads the new organization. Other officers are: vice-president, Hugo Hemmerich of the Berkshire Knitting Mills; treasurer, F. E. Sturve of the Apex Hosiery Co. It is believed that the association will concern itself primarily with employer-employee relations.

•

Rayon Knitters Name Officers

H. B. Kevelson has been named executive secretary of the Rayon Circular Knit Fabrics Manufacturers Association. Mr. Kevelson was formerly with the Twentieth Century Rayon Textiles. The other officers who have been elected on a permanent basis are: president, I. Rogosin of the Beauknit Mills; vice-president, Mitchell Wolfsie of the Jerome Knitting Mills; secretary and treasurer, Al Grodnick of the Algro Knitting Mills. Overtures for association with the Underwear Institute have been made.

The purposes of the new organization are set forth as follows:

To foster and develop the interests of persons, firms and corporations engaged in the manufacture and sale of rayon knitted fabrics.

To correct and reform abuses relative thereto.

To promote and combine the influence and intelligence of the members for protection against any imposition, injustice and fraud.

To diffuse accurate and reliable information as to all matters affecting the business of the members of the association.

To encourage all municipal, state and federal legislation that is wholesome and beneficial to the business of the members of the association and to commerce in general.

To establish and maintain uniformity and equity in the customs and usages of the trade.

To establish closer ties of business associations among the members to the end that the industrial art may be improved and the welfare of all may be more highly conserved.

To promote and effectuate the policies of the National Industrial Recovery Act and to do anything necessary, suitable and proper for the accomplishment of any of the purposes herein set forth or which may be recognized as proper and lawful objectives of trade associations; all of which shall be consistent with the public interests as well as in the interests of the industry and trade.

•

Eight Named For Hosiery Authority

Appointment of eight hosiery manufacturers to represent employers on the Hosiery Code Authority which was created by the hosiery code, was announced Sept. 11, by the National Association of Hosiery Manufacturers. The eight appointees follow: Hugh Hemmerich, Berkshire Knitting Mills; John Wyckoff Mettler, Interwoven Stocking Co.; William Meyer, president of the association and of Apex Hosiery Co.; James G. Hanes, Hanes Hosiery Mills; John H. Brine, Rollins Hosiery Mills; C. S. Kincaid, Magnet Mills, Inc.; Austin H. Carr, Durham Hosiery Mills, Inc.; Earl Constantine, managing director of the association.

•

Outerwear Association Prepares NRA Tags

To permit the ultimate consumer to distinguish between knitted outerwear garments produced by mills operating under the code and articles produced under "sweat-shop" conditions, the National Knitted Outerwear Association has prepared for its member mills tags which will be attached to all garments manufactured in accordance with the NRA provisions.

Printed in two colors, red and blue, on a white ground, the tags have the NRA insignia on the front and the emblem of the National Knitted Outerwear Association on the reverse side.

•

Hosiery Market Not Yet Normal

As might be expected where there was heavy buying prior to the price advances of the last month, the situation in the full-fashioned market is still far from normal. New prices named by the mills run into competition with stocks in the hands of distributors and retailers that were acquired at considerably lower levels. Several of the larger producers have named $7.25 per doz. for sheer and service weight 42-gage stockings, but there is not enough of a real market to serve as a test of buyer reaction.

One factor that will operate to bring things back to normal sooner than would otherwise be the case is that the six weeks strike at Reading served to diminish total full-fashioned production about one-third during the period and thus prevented an even greater accumulation of stocks. Improvement in retail trade has not been spectacular, but the trend, noted last month, away from "bargain" sales in retail stores has continued and serves as an indication that conditions are slowly righting themselves.

•

Underwear Mills Expect Sales Pick-Up

Prices that have been released on heavyweight underwear are on a basis of about $8.50 for the branded 14 lb. union suits and $8.12½ for the standard. Manufacturers state that the new prices do not fully reflect the added costs under code operation and that a further advance may be expected later, but buyers are skeptical and state that a fall in prices is more likely than a rise. There is not enough trading to test the opinion of either side.

In fact, the market is just approaching the position where any real trading at all is looked for. For many weeks mills have been running on large orders booked the early part of the summer and buyers, with adequate stocks on hand and coming in, have not been active. The situation is beginning to get back to normal, however, and fair business is looked for during the next month.

•

Reading Workers Vote for Union

The National Labor Board of the NRA made its first move in any industry when it stepped into the picture at Reading, Pa., where a hosiery strike on

union recognition had already been in progress some six weeks, and, on Aug. 10 negotiated an agreement between the manufacturers and workers whereby the latter would return to their jobs and, by means of a secret ballot, chose chairmen to represent them in dealings with management.

Of the total vote cast, 10,296 employees were in favor of union representation while 3,786 voted non-union. By a majority of 10,051 to 3,311 the workers in 36 mills elected union representatives. Eight mills chose non-union representatives with a total vote of 475 to 245.

•

General F-F Strike Called Off

Through the intervention of the National Labor Board, the general strike in the full-fashioned hosiery industry was called off on Aug. 31, the day before it would have been effective. Although the strike was supposed to be country-wide, the supposition was that it would be effective at first only in the Philadelphia. According to the terms of the agreement negotiated by the National Labor Board, employees are to continue at work for 22 days, during which time every effort will be made to settle differences. If no decision is reached by the end of the period the National Labor Board itself will arbitrate the case.

Blood was spilled in a riot at the plant of the Cambria Silk Hosiery Co., Philadelphia, on Aug. 31, when two men were killed and a score injured. Employees of the plant have been on strike since early July, demanding a closed shop. It is understood that negotiations were nearing completion when the riot occurred.

•

Survey Shows Rise in Cost of Selling Hose

The expense of selling hosiery in small stores has increased approximately one-third during the last two years, according to a report prepared by the merchandising division of the National Retail Dry Goods Association. The added expense, however, has been slightly more than offset by a somewhat higher markup figure and a decrease in markdowns.

•

Non-Run Hosiery Patents

A decision of the Examiner of Interference, U. S. Patent Office, regarding the Graenz non-run hosiery patents Nos. 1,856,063 and 1,862,514, awards claims 1 to 11 in both patents to Nathan Schwartz, and holds claims 12 to 15 as favorable to the Graenz interests. The Schwartz non-run invention is controlled by the Textile Patents Corp., Philadelphia. The decision may be appealed to the Board of Appeals, U. S. Patent Office, and to the United States Board of Customs and Patent Appeals.

KNIT GOODS IN THIS ISSUE

	page
Rayon in Hosiery; Dull Luster, Fine Filaments	68
Rayon Underwear; Larger Cones, Magazine Feed	70
Status of Codes Shows Rapid Progress	79
Textile Codes at a Glance	80
Hosiery Industry Code Approved	83
Effect of Code Cannot Yet Be Gaged Accurately	84
Warmth—Weight Study of Knit Goods	91
Full-Fashioned Defect Recorded by Camera	94
Pin Stitches and Two-Tone	100
Small Half-Hose Mill	101
Jack Cut Presser	104

Knitting Mill News

West Coast-Manchester Mills, Inc., Los Angeles, Calif., is the name of the merged Manchester Knitting Mills and the West Coast Knitting Mills. Operations will be concentrated in the new plant of the latter company.

Colorado Knitting Mills, Denver, Colo., recently organized by Philip C. Friend, Denver, and asociates, plan early operation of local mill. Property is being leased for plant.

Real Silk Hosiery Mills, Indianapolis, Ind., stockholders have approved the plan to acquire the **Westcott Hosiery Mills,** Dalton, Ga., which has been under lease to Real Silk for five years.

Arrow Silk Hosiery Co., Inc., Irvington, N. J., has been acquired at a receiver's sale by Max J. Shapiro, Summit, N. J., and associates, for consideration of $33,250. New owner is planning to reorganize company and operate mill.

Schenke Mfg. Co., Jersey City, N. J., has plans under way for a new two-story addition to knitting mill and improvements to cost over $35,000.

Progress Knitting Mills, Paterson, N. J., are now in hands of Roy Lapshire as permanent receiver. He is negotiating to sell plant.

Hatch Full-Fashioned Hosiery Co., Belmont, N. C., recently awarded contract to L. S. Costner, Cherryville, N. C., for the erection of a plant addition costing about $10,000. R. C. Biberstein, Charlotte, N. C., prepared plans. About 100,000 sq.ft. will be provided to permit later addition of a 15-machine unit, and a separate building for cafeteria and rest room.

McEwen Knitting Co., Burlington, N. C., has awarded the contract to the Fowler-Jones Lumber Co., Winston-Salem, N. C., for an addition to plant, measuring 84x110 ft., and costing about $100,000.

Hudson Silk Hosiery Co., Charlotte, N. C., recently awarded contract to Louis Cook, Charlotte, for erection of a plant addition containing 32,000 sq.ft., and costing $30,000, exclusive of equipment. The present building will be extended making the total length 340 ft.

Pauline Hosiery Mill, East Valdese, N. C., is completing construction of a one-story addition, 35x60 ft. J. M. Brinkley & Son are the contractors.

Melrose Hosiery Mills, High Point, N. C., recently built an addition to accommodate equipment obtained by the purchase of **Superior Hosiery Mills,** Lexington, N. C.

Adams-Millis Corp., Kernersville, N. C., awarded contract to R. K. Stewart & Son, High Point, N. C., for the construction of mill addition representing expenditure of about $30,000.

Baker-Mebane Hosiery Mills, Inc., Mebane, N. C., has been organized and has taken over the complete assets of the **Wyrick Hosiery Mills,** and will operate it as a seamless knitting division of the **Baker-Cammack Corp.** The officers are: J. E. Baker, president-treasurer; W. C. Mull, vice-president; J. M. McIntyre, secretary; capital stock, $100,000.

Star (N. C.) Hosiery Mills, Inc. Clay Richardson has been appointed temporary receiver for this company.

Denton Hosiery Co., Thomasville, N. C., has leased a building at the old Kindergarten plant, West Guilford Street, equipped to finish the hosiery knitting at the Denton plant.

Kraemer Hosiery Co., Nazareth, Pa., has concluded arrangements for purchase of the former mill of **Kaltenbach & Stephens, Inc.,** Carlisle St., East Allentown, Pa., idle for about three years. New owner will make improvements.

Ontario Silknit, Ltd., Toronto, Canada, has purchased **Aberley Knitting Mills,** now in bankruptcy.

Richmond Hosiery, Ltd., London, Ont., Canada, plans an addition to its plant towards the end of the year. Meanwhile, 15 new knitting machines are being installed in the existing plant.

•

Knitting Mill Statements

Gotham Silk Hosiery Co., Inc., including subsidiaries, reports for six months ended June 30, 1933, a net loss of $207,922 after all charges, compared with a net profit in the 1932 period of $62,765.

Munsingwear, Inc., and subsidiary corporations report for the six months ended June 30, 1933, net loss of $246,339, after all charges, compared with a net loss in the same 1932 period of $788,032.

Real Silk Hosiery Mills, Indianapolis, Ind., reports net loss for six months ended June 30 of $8,786 compared with net loss of $173,900 for similar period last year.

TEXTILE WORLD'S

Processing Digest

THE annual convention of the American Association of Textile Chemists and Colorists held this month in Chicago again focuses attention on the achievements of this organization in increasing knowledge of the application of dyes and chemicals and fostering textile research. Particularly important has been the work of the research committee in devising standard methods for determining the fastness properties of dyed textiles, shrinkage of fabrics, analysis of textile chemicals, etc. Commendable also is the fundamental and applied research on silk and wool carried out by the society's research associates. Not the least valuable accomplishment is the tabulation of American dyes according to *Colour Index* numbers. Further amplification of the association's research activities depends largely on the number of corporate members which can be secured. And herein lies an opportunity for the dyeing and finishing establishments to assure uninterrupted investigation of the problems of the industry.

Silk Dyers Organize Price Information Exchange

The Institute of Dyers & Printers, which now includes over 100 silk dyeing and printing firms, has organized a price information exchange which is authorized to secure, distribute, and exchange price information as provided for in Section I of the trade-practice code for the industry. This code, tentatively approved by the President, requires that a list of prices be filed with the secretary of the institute for each of the several services rendered by each member and that these concerns shall not quote or make prices other than those filed until five days after filing a new list of prices with the secretary.

•

Specialized Finishers Submit Codes

Codes of fair competition were submitted to the NRA on Aug. 26, by the Canvas Waterproofers' Association, the Rug Chemical Processing Association, and the Institute of Book Cloth and Impregnated Fabrics Manufacturers. The waterproofers' code provides for minimum wages of $13 per week in the North and $12 per week in the South, a schedule of hours for labor not in excess of 40 hours per week, and a schedule for operation of productive machinery not in excess of two 40-hour shifts in any one week. The rug processors' code calls for the establishment of a 40-hour week and includes a schedule of minimum hourly wages, the lowest rate being 25c. per hour for female help and 35c. per hour for male employees. The book cloth manufacturers' code stipulates 40-hour week for all employees, except those engaged in the operation of machines used as a part of a continuous process, in which case 48 hours of work per week is the maximum. Minimum wages specified are 35c. per hour in the North and 32½c. per hour in the South.

•

A.A.T.C.C. Notes

At the annual convention of the American Association of Textile Chemists & Colorists, held Sept. 8 and 9, in Chicago, the following technical papers were presented: "Chemistry in Merchandising," B. H. Harvey, Director, Montgomery Ward & Co.; "The Iodine Number of Wool," Milton Harris, Research Associate A.A.T.C.C.; "Peroxide Bleaching—A Report of Progress," H. G. Smolens, Buffalo Electro-Chemical Co.; "The Rayon Industry—A Quarter Century of Progress," Harold D. W. Smith, A. M. Tenney Associates; "A Century of Progress in the Wallpaper Industry," J. G. Stott, Jr., Ciba Co.; "A Comparison of Methods for the Estimation of Small Amounts of Copper in Textiles," Walter M. Scott, G. J. Esselen, Inc.; "The Relation Between Tensile Strength and Orientation of Cellulose Fibers," Wayne A. Sisson, University of Illinois; "Chemical Constitution and Wetting Action," W. Kritchevsky, Rit Products Co.; "Modern Theories of Sulphonated Oil," Lloyd H. Davis, National Oil Products Co.; "Development in the Application of Fatty Alcohol Sulphates," Samuel Lenher, E. I. du Pont de Nemours & Co.; "New Possibilities in the Lubrication of Textile Fibers," Charles B. Ordway, Alabama Polytechnic Institute; and "Uses of Starch Products in Textile Industry," H. A. Crown, Corn Products Sales Co. A detailed report of the meeting will appear in our October issue.

•

Finishing Activity

Finishing activity gaged by orders received declined from 62% normal average capacity in July for white and dyed combined and 96% for prints to 41% and 53%, respectively, in August, according to figures released by National Association of Fnishers of Textile Fabrics.

•

Textile Designers Organize

The Textile Designers Guild of America, Inc., New York, has been chartered as a membership corporation without capital stock. The purpose of the organization is to provide textile designers with a representative and centralized agency to further the trade and commercial interests of its members; reform abuses relative thereto; obtain freedom from unjust demands, claims, and exactions; distribute accurate information as to the standing of purchasers of designs; procure uniformity and certainty in the customs, practices, and trade usages of the textile designing industry; and encourage and assist in the observance by its members of the obligations imposed by the Recovery Act. Other aims of the Guild are to foster and stimulate creative designing and to assist in the production and promotion of American designs. Baker & Obermeier, 37 Wall St., New York, are attorneys for the Guild.

•

Testing Laboratories Prepare Code

A tentative code of fair competition for commercial testing laboratories has been referred to some 500 laboratories. According to D. E. Douty, vice-president and general manager, United States Testing Co., Inc., the code is receiving favorable response, and it is planned to submit it to the NRA when it receives the approval of a majority of the laboratories throughout the country.

•

Rayon Yarn Processors Join National Guild

Amalgamation of the National Rayon Processors Association with the National Textile Processors Guild, Inc., was effected last month, and four new divisions of the latter organization have been set up to provide representation for the rayon group. Divisions now included in the Guild are wool raw stock and tops dyers; cotton yarn dyers and processors; woolen and worsted yarn dyers and processors; woolen and wor-

sted woven piece goods dyers and finishers; woolen and worsted knitted piece goods dyers and finishers; hosiery dyers and finishers; glazed yarn processors; rayon yarn dyers; rayon yarn converters; rayon yarn throwsters; and manufacturers of novelty yarns. Under the present arrangement, the merchandising activities of the various rayon divisions will be continued by the Rayon Processors' Association, while all processing functions will come under jurisdiction of the Guild.

•

Offer Salesmen's Code to Institute of Dyers and Printers

A code prepared by the Salesmen's Association of the Textile Dyeing & Printing Industry has been submitted to the Institute of Dyers & Printers, with the request that it be made a part of the industry's code. At a special meeting of the trustees of the Institute, the salesmen's code was turned over to a special committee for consideration.

•

New Dyestuffs

General Dyestuff Corp. announces the following new products:

Immedial Brilliant Green 5G, a sulphur dyestuff giving bright, yellowish green shades of very good fastness to washing, perspiration, rubbing, hot pressing, and alkali; it has good leveling properties and very good solubility.

Wool Fast Blues GLA and BLA, acid dyestuffs, which on wool and silk produce shades of very good fastness to light, washing, and salt water; fastness to washing and salt water are increased by chroming.

Alizarine Sky Blue FFB, an acid color giving clear, bright shades of very good fastness to light; good fastness to rubbing, water, and alkali; and excellent fastness to carbonizing, decatizing, hot pressing, and stoving. It is recommended for application to wool and pure and weighted silk.

Indanthrene Blue Green FFBA, a vat dyestuff of particular interest to cotton printers, especially for use in connection with Algol Yellow GCA to produce shades of green at low cost.

Carbic Color & Chemical Co., Inc., announces the following new product:

Indigosol Green IBA, a water-soluble vat dyestuff, which on cotton or rayon yields brilliant green shades of very good to excellent fastness properties; it is recommended also for production of fast shades on pure-silk wash goods and for dyeing of wool.

•

Issues Fall-Season Color Cards

Fall-season color cards for the dyeing and hosiery industries have been issued recently by the Textile Color Card Association of the United States, Inc. To facilitate matching of colors, a loose-leaf tab of swatches duplicating the colors portrayed in the card, is included with the hosiery color card. The association has sent out also a color-coordination guide to be used with this card.

•

New Industrial Fellowship at Mellon Institute

Research on the textile applications of molecularly dehydrated phosphates is now being carried out by Dr. Bernard H. Gilmore as a part of his investigation at Mellon Institute of the properties and uses of these materials. In these studies particular attention will be accorded to "Calgon," which is essentially sodium metaphosphate. Preliminary study has indicated that these compounds are of special value as detergents for dissolving residual calcium soaps and similar substances, as well as for water-softening purposes. The New Industrial Fellowship under which Dr. Gilmore is making this investigation was founded recently by the Buromin Co., Pittsburgh, Pa.

•

Shrinkage Specifications To Go To Federal Trade Commission

Specifications for shrinkage of woven cotton shirtings, sheetings, suitings and upholstery fabrics have been drawn up by the Shrinkage Committee of the New York Board of Trade, and are expected to be presented to the Federal Trade Commission for action. The specifications provide that the fabrics shall be designated by a legend stamped on the selvage guaranteeing shrinkage in both length and width not to exceed a stated amount expressed as a per cent of the original measurement. Terms, such as "shrink-proof," implying absolute conditions, shall not be used, but a term indicating that the cloth has undergone a pre-shrinking process may be used, provided it is followed by the legend mentioned above. The specification gives also a method for testing the fabrics for shrinkage.

PROCESSING IN THIS ISSUE

	page
Wide Choice of Materials to Size Rayon Warps	64
New Finishes Attest Gains in Rayon Processing	66
Status of Textile Codes Show Rapid Progress	79
Textile Codes at a Glance	80
Effect of Code Cannot Yet Be Gaged Accurately	84
Ageing Vat Colors—Engineering Problems	92
Research on Fulling Points Way to Change	95
Care of Palmer Blankets	100
Compounded Rubber Pot-Eyes	102
Two-Speed Rotary Size-Pump	103
Photo Electric Color Matcher	103

Cellulose Chemistry Discussed at A.C.S.

Discussion of various phases of cellulose chemistry holds an important place in the meeting of the American Chemical Society being held in the Hotel Stevens, Chicago, September 10 to 15. Two of the technical papers scheduled for presentation before the Division of Cellulose Chemistry which should be of particular interest to textile technologists are those on "Crystallite Orientation in the Cell Walls of Cellulose Fibers," by Wayne A. Sisson; and "An X-Ray Examination of Fragments of the Cellulose Molecule," by G. J. Zeuck and H. Mark.

•

Finishing Plant News

Warwick Print Works, East Bound Brook, N. J., are considering early rebuilding of plant, comprising three main mill units, recently destroyed by fire with loss of about $125,000.

Rayon Piece Dyeing Corp., North Bergen, N. J., has arranged for change of company name to the **Colonial Piece Dye Works, Inc.**

Caledonia Print Works, Paterson, N. J., has been organized with capital of 10 shares of stock, no par value, to operate a local dye and print works. New company is represented by Emanuel Shavick, Paterson, attorney.

Wilson Finishing Co., Burlington, N. C., is erecting a mill building, 107x 210 ft., brick and steel construction, which will cost about $45,000.

Carolina Dyeing & Winding, Inc., has succeeded to the business of the **Carolina Dyeing & Winding Co., Inc.,** Mt. Holly, N. C., following the payment of 100% on claims of general trade creditors of the old company. Paul Stevens will cease to function as receiver of the old company as soon as remaining details are cleared up. Edwin F. James is president of the new company and Paul Stevens, treasurer. Policies will be continued as heretofore.

Union Bleachery, Greenville, S. C., has completed a 40,000,000 gal. reservoir to supply water for the plant and the village.

QUOTATIONS

At close of business, Sept. 1, 1933

Prices cover average qualities unless otherwise stated.

Cotton Goods

	*Sept. 1	*Aug. 1	Sept. 1 1932
PRINT CLOTHS			
27 -in., 64x60, 7.60	4¾	5¾	3¼
38½-in., 64x60, 5.35	6½	7½	4⅜
39 -in., 68x72, 4.75	7⅛	8⅛	4½
39 -in., 72x76, 4.25	8½	9½	4¾
39 -in., 80x80, 4.00	8¾	10	5⅜
BROWN-SHEETING			
36-in., 56x60, 4.00	7¼	9½	5
36-in., 48x48, 5.00	6½	7¾	3¾
37-in., 48x48, 4.00	7¾	8¾	4⅛
MISCELLANEOUS			
Drills, 37-in., 3 yd.	11½	10	6
Denims, 2.20	17	17	10½
Tickings, 8 oz.	20	18	11
Standard prints	7¼	7¼	5¼

*Tax included.

Cotton Waste

Peeler comber	11.50c
Peeler strip	10.50c
White spooler (single)	6.00c

Cotton Prices

Spot Cotton at:	Sept. 1	Aug. 1	For Month High	For Month Low	1932 Sept. 1
New York	9.45	10.40	10.45	8.65	8.30
New Orleans	9.20	10.36	10.40	8.55	8.19
Liverpool	5.60	6.17	6.31	5.46	5.22

FLUCTUATIONS OF FUTURES

	Closed Sept. 1	For Month High	For Month Low	Closed Aug. 1	Net Change
Sept.	9.17	10.44	8.57	10.00	—0.83
Oct.	9.35	10.56	8.71	10.12	—0.77
Nov.	9.44	10.67	8.80	10.23	—0.79
Dec.	9.54	10.78	8.89	10.34	—0.80
Jan.	9.64	10.87	9.01	10.41	—0.77
Feb.	9.72	10.94	9.07	10.48	—0.76
Mar.	9.81	11.02	9.13	10.56	—0.75
April	9.89	11.10	9.23	10.60	—0.71
May	9.98	11.19	9.34	10.77	—0.79
June	10.06	11.25	9.41	10.85	—0.79
July	10.15	11.35	9.48	.....	.....

AVERAGE PRICE JUNE-JULY SHIPMENT HARD WESTERN COTTON

	F.o.b. New England Middling	St. Middling
1⅛-in.	12.04c	13.04c
1 5/16-in.	12.54c	14.04c
1¼-in.	16.54c	17.54c

FOREIGN COTTONS

Alexandria Exchange, Sept. 1		Change
November, Sak	13.70	—1.64
October Uppers	11.22	.....
Aug.-Sept. Shipment c.i.f. Boston (Tariff not included)		
Medium Sak	23.00	+1.00
Medium Uppers	22.50	+1.00
(By Anderson, Clayton & Co.)		
India Rough, Calcutta Camilla		9.00c
Peruvian Tangius Strict Middling		22.75c
China Tientsin No. 1		9.75c

Quotations on cotton cloth and cotton yarn as given on this page for Sept. 1 include the cotton processing tax. Where figures for earlier dates are given for comparison, such figures do not include this tax.

Cotton Yarn (Nominal)

(Tax Added)

CARDED (Average Quality)

Double Carded 2c—4c., higher according to quality

SINGLE SKEINS OR TUBES (Warp Twist)

4s to 8s	$0.29	20s	$0.32½
10s	– .29½	24s	– .35
12s	– .30	26s	– .36
16s	– .31½	30s	– .38½

TWO-PLY SKEINS AND TUBES

8s-2	$0.29½	20s-2	$0.33
10s-2	– .30½	24s-2	– .35½
14s-2	– .31	30s-2	– .39
16s-2	– .32	40s-2	– .48

SINGLE WARPS

10s	$0.30	20s	$0.33
14s	– .31	24s	– .35½
16s	– .32	30s	– .39

TWO PLY WARPS

8s-2	$0.30	20s-2	$0.33½
10s-2	– .31½	24s-2	– .36
14s-2	– .31¼	30s-2	– .39½
16s-2	– .32	40s-2 ordin.	– .50

HOSIERY CONES (Frame Spun)

8s	$0.28½	18s	$0.32½
10s	– .29	20s	– .33
12s	– .30	22s	– .34
14s	– .31	24s	– .35½
16s	– .32	26s	– .35½

COMBED PEELER (Average Quality)
TWO-PLY — (Knitting Twist) Cones

20s-2	$0.45	50s-2	$0.59
30s-2	– .48½	60s-2	– .69
40s-2	– .55	80s-2	– .90

WARPS, SKEINS AND CONES
TWO-PLY — (Warp Twist)

20s-2	$0.46	50s-2	$0.61
30s-2	– .49	60s-2	– .71
36s-2	– .53	70s-2	– .82
40s-2	– .56	80s-2	– .93

SINGLES

14s	$0.42	38s	$0.53
20s	– .45	40s	– .54
28s	– .47	50s	– .57
30s	– .48½	60s	– .68

MERCERIZED CONES — (Combed, Ungassed)

30s-2	$0.63	60s-2	.85
40s-2	– .68	80s-2	1.15

Raw Silk

Prices Nominal

	13/15	20/22	
	White	White	Yellow
Super Grand, 87%..	$2.18	$2.00	$1.98
Special Grand, 85%.	2.12½	1.92	1.90
Grand XX, 83%...	2.07½	1.90	1.87
Special Crack, 81%.	2.00	1.87	1.85
Crack XX, 78%....	1.95	1.85	1.82
Extra, Extra, 73%..	1.90	1.92	1.80
Best Extra, 68%....	1.85	....	....

RAW SILK EXCHANGE

	Sept. 1	Aug. 1	For Month High	For Month Low	Net Change
September	1.77	1.85	1.89	1.73	—0.08
October	1.77	1.86	1.89	1.73	—0.09
November	1.77	1.85	1.89	1.73	—0.08
December	1.79	1.85	1.89	1.77	—0.06
January	1.80	1.86	1.89	1.73	—0.06
February	1.78	1.86	1.89	1.73	—0.08
March	1.78	1.86	1.89	1.73	—0.08

Silk Yarns

Hosiery tram 5thd, Japan, 85%	$2.80
Hosiery tram, crack XX, 78%	2.65
60/2 spun silk	2.95

RAYON WASTE

Thread	$0.14–0.16

Wool

OHIO, PENNSYLVANIA, ETC. (GREASE)

Fine delne.	$0.32 –$0.33	⅜ blood	$0.37 –$0.38
Finecltng.	.25 – .26	¼ blood	.36 – .37
½ blood	.33 – .34		

TEXAS AND CALIFORNIA (CLEAN)

Texas, 12 months	$0.76 –$0.78
California, Northern	.72 – .73

MONTANA, IDAHO, WYOMING (CLEAN)

Staple fine	$0.80 –$0.82
Staple ½ bld.	.77 – .78
Fine and fine medium (original bag)	.77 – .78
⅜ blood	.75 – .76
¼ blood	.68 – .70

EASTERN SCOURED PULLINGS

A.A.	$0.83 –$0.85	B-Super	$0.72 –$0.74
A-Super	.75 – .76	C-Super	.66 – .67

CARPET WOOL (Nominal)

Aleppo (clean)	$0.23 –$0.24
Sining	.16 – .18
China filling (clean)	.19 – .21

Tops and Noils

TOPS—BOSTON

Fine (64-66s)	$1.11 –$1.12
Half-blood (60-62s)	1.07 – 1.08
Aver. ⅜ blood (56s)	.99 – 1.00
¼ blood (50s)	.91 – .92

NEW YORK TOP FUTURES

	Closed Aug. 1	For Month High	For Month Low	Closed Sept. 1
September	96.00	96.30	91.30	94.80
October	96.40	96.30	91.50	95.00
January	97.30	97.50	91.80	95.10
March	98.50	97.50	92.00	95.30
June	99.00	97.50	92.30	93.50

TOPS—BRADFORD ENG. (Sept. 1)

Fine (64s)	33d	⅜ bld. (56s)	23½d
½ bld. (60s)	31d	¼ bld. (50s)	17 d

NOILS — BOSTON

Fine	$0.58 –$0.60	⅜ bld	$0.53 –$0.54
Half bld	.55 – .56	¼ bld	.50 – .51

Worsted Yarns

ENGLISH SYSTEM WEAVING

2-20s 44s	$1.10 –$1.15	2-36s 58s	$1.37½–$1.42½
2-30s 46s	1.30 – 1.35	2-40s 60s	1.42½– 1.47½
2-30s mixes	1.65 – 1.70	2-50s 64s	1.62½– 1.67½

ENGLISH SYSTEM KNITTING

2-20s 44s	$1.10 –$1.15	2-20s 60s	$1.25 –$1.30
2-20s 50s	1.15 – 1.20	2-20s 64s	1.27½– 1.32

FRENCH SYSTEM

1-26s 64s	$1.35–$1.40	2-40s 64s Zephyrs	$1.57½–$1.62½
1-30s 64s warp	1.45 – 1.50	2-50s 66s	1.65 – 1.70

Domestic Rayon

VISCOSE PROCESS

Denier	Filament	Price	Denier	Filament	Price
50	14	$1.25	150	24–40	$0.65
75	30	1.00	150	60	.70
100	40	.85	300	44	.55
125	36	.72			

NITRO-CELLULOSE PROCESS

Denier	First Qual.	Denier	First Qual.
75	$1.05.–$1.10	150	$0.70
100	.90 – .95	175	.70

ACETATE PROCESS

Denier	Price	Denier	Price
45	$1.40	100	$1.10
60	1.25	120-125	1.05
75	1.15	150	1.00

CUPRAMMONIUM PROCESS (TWISTED)

Denier	Filament	Price	Denier	Filament	Price
30	24	$1.60	100	75	$1.00
75	60	1.20	150	112	.90